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Harvard College Library

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JONATHAN BROWN BRIGHT

of Waltham, Massachusetts, is to be expended for books for the College Library. The other half of the income is devoted to scholarships in Harvard University for the benefit of descendants of

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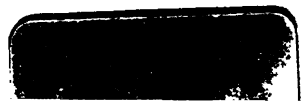

TRANSACTIONS

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OF

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PREFACE.

In committing to the press a second volume of the "TRANSACTIONS OF THE LITERARY AND HISTORICAL SOCIETY OF QUEBEC," it seems necessary to state some particulars respecting the origin and progress of the Society, which have not appeared in the first volume. We may thus account for the discrepancy apparently existing between the name adopted by the Society, and its published Transactions, which, with few exceptions, are not devoted to what is strictly considered literary or historical research.

It is generally known here, that numerous documents exist in the Public Offices, in the Convents, and in the Possession of Individuals, containing valuable and curious matter, hitherto inedited, respecting the Aborigines and early settlers of Canada. The Earl of Dalhousie, in founding a society in Quebec, in the year 1824, had chiefly in view the collection and arrangement of these papers, from which it was expected that much historical information would be gleaned, and fresh light thrown on the state of society, customs, &c. of the Indians in their primitive state, before they were corrupted by their intercourse with Europeans. —Natural History, and other departments of Science, held only a secondary place in the researches about to be instituted. But either from want of inclination, or sufficient

leisure for such pursuits, or from a difficulty of obtaining the documents referred to, from those in whose possession they are, the Society has not as yet made any considerable progress in these primary objects. Matter however of another, and perhaps not less valuable kind, has been brought forward; and it is hoped that the papers contained in this volume, on the language of a race that is rapidly passing away, and on the productions and capabilities of a country hitherto, in a great measure unknown, will be received with some interest.

The former volume of Transactions consisted principally of papers presented to the Literary and Historical Society, between the time of its first foundation, and the year 1829, During this period another society was formed in Quebec for the promotion of Arts and Sciences in Canada. His Excellency Sir James Kempt, who at this time became the Patron of both societies, and to whom, in their separate and united states, they are indebted for constant and liberal support, suggested the advantage that must accrue by bringing together whatever talent or resources either possessed. Under his auspices an union was subsequently formed between them, and the present volume is the first result of their united efforts.

Though the acquisition of information on subjects connected with the Canadas, is a leading object with the present society, that object is not the only one it has in view. Of equal importance, in its estimation, is the endeavour to excite in the rising generation, a taste for scientific knowledge and pursuits, and at the same time to afford facilities for their cultivation. With these views, a grant of £250, supplied by the liberality of the Provincial Parliament, together with a considerable sum from the Society's private

funds, has been laid out in the purchase of Books on useful and Scientific subjects, and of Instruments and Materials for Chemical Analysis and experiments, for demonstrations in Natural Philosophy, and for Practical Astronomy. The Mineralogical Cabinet, and the collections of native Botanical, and Geological specimens, which are daily increasing by the kindness of various contributors, will tend much towards forwarding the same purpose. And the Society expects soon to possess sufficient materials to form the subjects of lectures on different sciences, to be delivered either by some of its own members, or by occasional visitants.

In accordance with these objects; with the desire of giving publication to matters of general interest, and, at the same time, of exciting those persons, who possess talents and opportunities for observing, to record and transmit the result of their observations, the present volume is submitted to the Canadian reader.

Quebec, 30th December, 1830.

Remarks on CORAL ANIMALS *in the Gulf of St. Lawrence, by Capt.* BAYFIELD, *R.N.*

THE rapid growth of Corals in Tropical climates, is a fact which has attracted the attention of naturalists in all ages, but it was not until the end of the sixteenth or beginning of the seventeenth century that their true nature appears to have been suspected. From the time of Pliny, up to the period I have mentioned, they were considered to be marine plants. A French naturalist, I believe, first observed that the various ramifications of the coral were inhabited by numerous tribes of insects or minute animals. These animals were observed to have the power of protruding themselves from, and receding into small apertures. It has also been noticed, that when first taken out of the sea, the points which are protruded are soft, and that they are filled with a milky fluid; hence it has been inferred that nature has not been deficient in this any more than in every other case with which we are acquainted, in providing these animals both with the means of subsistence, and of forming their peculiar abode in the ocean.

It will be unnecessary for me to trespass on the time of the society, by entering into a description of the stupendous operation of the coral animals in seas between, or in the vicinity of the Tropics.—They are best described in the writings of Dr. Foster, and in the voyages of Flinders and

Kotzebue; more recently still by the French naturalists, M.M. Guoi and Gaimard. These last writers have stated that the works of these animals do not commence at such amazing depths as has been supposed, but that they carry on their operations around and on the summit of submarine rocks, generally at a depth not exceeding twenty-five or thirty feet below the surface of the sea. This depth, I have little doubt is underrated, for I have seen coral in the West Indies at much greater depths, and the specimens which I now present, were obtained from the bottom between twenty and thirty fathoms below the surface.

The various kinds of coral are now stated by naturalists to be the work of various tribes of lithophytic animals, all more or less minute, of which the different species of madrepores are by far the most numerous.

The specimen No. 1, was obtained by accident, a fish-hook having fastened in one of its cavities, by which it was drawn up from the bottom; the depth was between twenty and thirty fathoms, and we were then off the north coast of the island of Anticosti, and within the 50th degree of north latitude. I at first imagined that it was something new to find corals in a latitude so far north, but I have now my doubts of its being anything very uncommon, from finding that Cuvier makes the following observation respecting some of the genera of lithophytes, viz.—"It occurs most frequently in tropical climates, and decreases in number and variety as we approach the poles."

This specimen is composed of a mass of Anticosti limestone, around the sides and upper parts of which is a sort of cement, the produce and the abode of the animals which I have next to mention.

It will readily be perceived that there are a number of

points of a dull red colour protruding from the mass.—These, when first taken out of the water, were all living, moving with a rapid vibratory motion, as if distressed by the change from their own to another element. They were then soft, to a degree sufficient to admit of bending, and the points were of a much deeper red. When touched by the finger, they instantly withdrew themselves into their apertures, emitting at the same time, a milk-like fluid, with so much force as to indicate considerable muscular power; one of them was drawn out, and appeared to be attached to the bottom of its cavity by a fibrous root.

Subsequent examination has, however, made me doubt this last inference, and I am now of opinion, that what we took for a root was the torn fragments of the animal itself, as will appear probable from the following observations:—

A piece of the coral matter was placed in muriatic acid diluted with about twice its quantity of water. The acid took up the whole of the calcareous matter.—There remained floating in the solution a mass of animal matter, gelatinous in appearance, but nevertheless possessed of considerable tenacity.

It retained in some degree its former shape, and the points still remained attached and distinct, as in the coral state.

We could not distinguish the structure of the animal, which, perhaps, could only be perceived by means of a highly magnifying power, at a time when the animal is living or very recently dead.

That these animals contain a head, muscular system, and alimentary canal, appears nearly certain from the preceding observations. I am therefore of opinion, that each of the points which has been mentioned as having the

power of protruding and withdrawing itself, and also of secreting and ejecting a milk-like fluid, apparently for the purpose of forming its habitation, is a distinct, but not a separate animal.

It is known that some of the zoophyta multiply life by throwing out animated branches, or polypes, which possess the power of spontaneous motion, and of throwing out new shoots in their turn.

These shoots, or branches, thus possessing the powers of the original animal, may be said to be distinct although not separate.

It is from a consideration of the preceding observations respecting zoophytic animals, joined to what I have observed and related respecting the animals now under consideration, that I have formed the opinion above given, viz.—that the animated points are distinct, yet not separate animals. I think that they are shoots thrown out by the original animal.—At any rate three or four of them were found united to the general animal mass, after the carbonate of lime had been separated by the process before mentioned.

One hundred grains of the coral yielded eight of animal matter when perfectly dried. Small as this quantity appears, it occupies a very large comparative space when wet, and probably also in its living state.

I regret that our engrossing duties did not admit of our examining the animals before death. They died soon after being taken from the sea, and when next looked at, which was not until some time afterwards, were found to be consolidated into their present coral state.

Besides the animals which I have been speaking of, there was a species of marine polypi on the surface of the coral

mass which, at first, we mistook for sea-weed, and were only aware of our mistake when we observed them to shrink from the touch. These were perfectly flexible, like sea-weed, and appeared to have nothing to do with the formation of coral. They have become so brittle, that they could not easily be preserved, and only one or two remained on the specimen, but several others I have placed in the accompanying scallop shell. There are also several small shells agglutinated to the coral, and one or two minute and radiated crustaceous animals.

The specimen No. 2, is a small sprig or branch of perfect coral, also from the coast of Anticosti. It was brought up from a depth exceeding twenty fathoms, sticking to the tallow at the bottom of the sounding lead.

From its radiated structure, which may be discovered by inspecting it with a lens, it was in all probability the abode and the produce of a species of madrepore.

The specimen No. 3, was submitted to my inspection by our worthy President, the Chief Justice, it was also brought up from the bottom, adhering to a sounding lead, and with the exception of the polypi at its top, appears similar to No. 1; but as I did not see it living I cannot speak particularly respecting it.

The specimen No. 4, was hooked up from a depth of thirty fathoms, in the bay of Gaspé. There are traces of coral-like concretions on it, but I give it principally on account of the crustaceous animals which were living in its cavities, and which still remain.

In presenting these specimens and accompanying remarks to the society, I have been actuated, less by a hope of communicating a new fact, than by a conviction of the utility of putting thus upon record, the existence of coral

animals in the sea around the island of Anticosti. The species are probably far from numerous, and their operations insignificant, when compared with the labours of similar though infinitely more numerous tribes in tropical seas. Yet every thing relating to a department of Natural History, as yet only imperfectly known, must be interesting, and I am not aware that any one has before noticed the existence of corals in the Gulf of St. Lawrence.

I cannot conclude these remarks without communicating to the society, those reflections which have been forced upon my mind by the consideration of the foregoing facts.—Geology teaches us that the numerous fossil corals and remains of testaceous animals found in the limestone strata must have lived and died in ancient seas. These once submarine strata have been laid bare either by the recession of the primeval ocean, or have been upheaved by a force from beneath, which has formed our present continents and islands at some extremely remote period, probably antecedent to the creation of man.

Turning from the consideration of the past, to that of the present, do we not perceive that numerous tribes of coral animals are still existing in our present ocean—that numerous tribes of testacea and crustacea still live and die in it; all of which contribute to create, or collect together an immense quantity of calcareous matter? The rivers, too, constantly carry down to the ocean great quantities of the various earths, which are for a time held in suspension, and finally deposited at the bottom of our seas. Similar causes are therfore still at work. New strata are imperceptibly forming, and it appears to be no extravagant supposition, that they may hereafter be destined for the support of vegetable or animal life, or even that the various

phenomena attending their future state, their organic remains, &c. may exercise the reasoning powers of a future race of mankind.

Remarks on the DISTRICT *traversed by the* ST. MAURICE EXPEDITION, *in the Summer of* 1829, *by Lieut.* INGALL, 15*th Regt.*

THE intention of the few following pages is to give a concise account of the component parts of the rock and soil forming the shores of the rivers and lakes explored, and to establish the probability of the same formation extending over the intervening area.

The impossibility of ascertaining the agricultural resources of a country, from merely passing up a river, is a very prevalent opinion, and one that would in the main be just, were the ascent pursued in a direct line, for it does sometimes occur that the shores of a river are low and covered with sand for a considerable distance back, although on further examination, the soil may be found to improve and the timber become of a finer description: but by making lateral excursions up smaller streams and closely examining the rock and soil on their shores, a pretty correct judgement of the country forming the area between those streams and rivers may be arrived at.

From the great sameness prevailing in the primitive formation met with on the route pursued, but little can be said on the rocks constituting the range which divide the waters flowing into Hudson's Bay and the River St. Lawrence, except accurately describing their occurrence; but it will be necessary to bring before the society one concise and general view of the country bordering the Rivers St. Maurice and aux Lievres, and also on the great chain of lakes lying between those two rivers; in order to prove the probability of the area comprised within their limits being of the same primitive formation, and covered with the same description of silecious sand, as that found constituting the shores of those waters.

At Three Rivers there exists an alluvial deposit of silecious sand extending about nine miles to the northward, forming a moderate sized hill on the south side of the St. Maurice. This hill abruptly terminates at the village of the Forges, and a lower and more level track stretches several miles farther to the north. This flat, although lower than the hill, is considerably higher than the river, and contains one or two extensive swamps; but the soil is of the same silecious sand as that found at Three Rivers.

Near the Gabelle Rapids, and on the south side of the river is a formation of limestone, containing embedded organic remains. At the Rapid Grais this limestone gives place to a sandstone, apparently fit for mill purposes: both these formations rest on the sienitic rock which forms the bed of the river. Where the sandstone terminates are large deposits of white clay bearing a thick covering of silecious sand. This clay ceases a little above Pigeon Island; and excepting at the Portage of the Shewanahegan,

and on the north shore near Cape le Blanc, where a small deposit of clay again makes its appearance, nothing but a light silecious sand is met with, resting to various depths on the primitive rock, as far as Wemontachinque.

In some places, particularly at the lower Caribou Mountain, and immediately above Rat River, the sand hills are from eighty to upwards of one hundred feet in height.

On the west side of Lake Manjeamagouth, a bed of clay is again found stretching towards the south; and this clayey deposit is fallen in with on the middle and lower parts of the River aux Lievres.

The sienitic rock which is found as low as the Grais Rapids, and probably extending below the Gabelle, contains a little black mica, but not sufficient to alter the character of the rock. On the shores are immense bowlders of quartz, containing abundance of common garnet, in some respects similar to the manganesian garnet, and possibly owing their violaceous hue to the presence of oxide of manganise.

At the junction of the Shewanahegan with the St. Maurice, we observe that remarkable subsidence of the land which forms the extensive basin, receiving the waters of the St. Maurice and Shewanahegan in one blended stream. On the north side of the basin is the almost perpendicular precipice of sienite, down which rush the waters of the St. Maurice in two separate falls, the river being divided by an island nearly a quarter of a mile in width. These falls are estimated at one hundred and fifty feet in height. At the foot of the precipice lye confusedly heaped together the debris of the rock, and opposite on the north shore are large blocks of a similar garnet-rock, as that before described at the Rapid Grais; except that they contain a very

small quantity of mica in thin layers. It is not improbable that the waters of the St. Maurice, may in time, force for themselves another chaunel through the clayey neck of land, over which now runs the portage, and thus form a third fall to the southward of the other two, and nearer the Shewanahegan River.

Another subsidence in the bed of the river occurs at the falls of the Grande Mere, about eleven miles above the Shewanahegan. These are near sixty feet in height, and pour over a rock of sienite, forming at their foot a similar basin and nearly of the same extent as that at the Shewanahegan. Here the river, in its course to the St. Lawrence, takes a turn almost at right angles; a circumstance common at all the falls and most of the rapids, not only on this, but many other rivers.

The rock from hence as far as Cape le Blanc, a high perpendicular precipice near seven miles higher up the river, continues to be a sienite with hornblende in excess; but at that Cape the hornblende diminishes in quantity, and the quartz and light red felspar occur in large sized crystals. This rock is much stained with the oxide of iron, particularly near the summit. Immense fissures intersect the rock in various directions, and bear evident marks of the excessive violence of that awful concussion which has thus torn asunder large mountains.

The sienitic formation continues without intermission as high as Wemontachinque. Occasionally, and for a short distance, it passes by regular gradation into gniess and very coarse granite, frequently containing crystals of garnet.

Large blocks of red felspar were seeen lying on the shores of the river and embeded in the rock in situ.—

Sometimes from the total absence of mica and hornblende the formation consisted of only two simple crystalline minerals, quartz and felspar, occasionally containing large masses of pure rock-crystal; and in one or two instances small portions of common magnetic iron ore.

On the River Nawartnoo, above the falls of Kanowdy, which lye some miles to the west of Rat River Post, the rock parts with its hornblende for some distance, and the place is supplied by small specks of black mica, and a little shorl. On the east shore of one of the lakes in this neighborhood, there occurred some common magnetic iron ore.

At the upper end of one of the small lakes of the Coo-coo-cash, communicating between the Rivers Vermilion and St. Maurice, was a strong chalybeate spring running through a bed of ferruginous clay, leaving a thick deposit of oxide of iron This stream seems to pass under a bank of gravel and coarse sand about thirty feet high, and two hundred and fifty feet wide, dividing this lake from another.

At Wemontachinque, and some other parts of the river, the rocks frequently contain small embedded crystals of deep red garnet; and sometimes was observed a compound rock of considerable extent, composed of common quartz, small crystals of flesh-red felspar, mica, hornblende and minute crystals of garnet. On the north shore of lake Malowin, we noticed crystals of iron glance and shorl embedded in coarse granite; these minerals we occasionally met with on other parts of the route.

About fifty miles above Lac du Sable on the River aux Lievres, is first seen a formation of calcareous spar. This rock occurs in small rhomboidal crystals, closely aggregated, its external structure much resembling tabular spar.

A vein of granular limestone nearly approaching in appearance to dolamite, runs through the calcareous formation, which is also intersected with broad veins of quartz and hornblende. This hornblende in many instances is vesicular, the vesicles filled with crystals of calcareous spar; there also occurred masses of quartz, containing nodules of the calcareous rock. At one place was observed a broad vien of epidote, running through the calcareous spar with an upper strata of quartz resting upon it; thin veins of calcareous spar passed through this epidote.

We occasionally fell in with the calcareous formation, until we reached Lac du Sable, where we again noticed it on the north shore, underlying a rock of light grey limestone containing in its composition an admixture of silecious matter, and some small orbicular crystals of milk colored quartz. These rocks are situate close to the edge of the lakes and rising immediately above them is a hill of sienite thinly covered with sand. The sienite is of a dark color, apparently stained with the oxide of iron.

Between Lac du Sable and the River Ottawa, we alternately fell in with the calcareous spar, and sienite, the hills being invariably composed of the latter. At the foot of the Cedar Portage, a few miles below Lac du Sable, the calcareous spar occurred, forming the bed of the river, but intersected with broad veins of silecious limestone, abounding in large crystals of talcy mica and white iron pyrites. The portage, which is rather above the level of the river, runs over a rock of sienite. About ten yards from the west shore rises a small hill of sienite, about two hundred feet in circumference, covered with moss and trees: the channel between it and the main shore consists of the calcareous spar, abounding with mica; near the

summit of the hill, about twenty feet above the water-mark, was procured a specimen of what, at first, appeared to be fluate of lime, but upon examination we have reason to believe it to be azurite. Immense quantities of apatite (phosphat of lime) was aggregated in veins, running through the calcareous spar, which formed the dry channel between the small sienitic hill and the main land.

On the shores of the "Little Lake of White Fish," about half a mile to the west of the post near Lac du Sable, and also on the shore of the "Great Lake of White Fish," to the southward of the post, were noticed large blocks of calcareous spar, containing small portions of carburet of iron. In one block, from which a specimen was procured, were found crystals of epidote. The portages leading to these lakes ran over hills of sienite.

At the foot of the Mill Portage, three or four miles above the Ottawa, the rock consists of red felspar, of an earthy appearance, with quartz and specks of serpentine. Overlying this rock is a broad vein of calcareous spar containing some carburet of iron.

In the vallies lying between the broken ranges of hills, are found deposits of silecious sand to great depths; but on the tops of those hills the covering of sand is scanty.—Where the beds of calcareous spar occur in the vallies, a different species of timber is generally found, from that covering the sides and summits of the adjacent mountains. In no instance, except near the Gabelle Rapids on the south side of the River St. Maurice, was seen the slightest trace of fossil organic remains; nor could the closest scrutiny discover among the sand, any fragments of shells; but in all the lakes were abundance of the genus mya.

The vast chain of lakes found on the lands height, and

constantly supplied, not only with living springs, but by the melting of the great quantities of snow which fall in these regions, find their outlet through the vallies occasioned by the dip of the mountains towards the south and S. S.W. and meeting in their course with the extensive basins formed by the subsidence of the rocky strata, spread themselves over the hollows; thus constituting the smaller lakes, which cover nearly one-third of the country lying between the lands height and valley of the St. Lawrence. These lakes discharge themselves by innumerable shallow streams, into the St. Maurice and aux Lievres Rivers, and ultimately blend with the waters of the St. Lawrence; in one or two instances the streams swell into large and rapid rivers and discharge into the Ottawa and Lake St. Peter in a direct course. The beds of all these lakes and rivers are of primitive formation, usually covered with sand, the debris of the neighboring rocks. Some of the lakes explored, were evidently once of much greater extent; while on the other hand some are annually encreasing in size, by the spring floods carrying away portions of their sandy banks.

On the summits and sides of the hills were seen immense angular fragments of rock, their edges but little worn; many are thickly covered with moss. These fragments lye embedded in sand; and doubtless owe the origin of their present situation to that great internal convulsion which has caused the stupendous precipices, so frequently seen in these mountain lands.

At what period this catastrophe took place it is not now easy to conjecture, whether at the retiring of the great waters which once covered this continent, or whether it was the effect of some subsequent earthquake, can be of no

immediate consequence to our present object to determine; our only desire is to point out the positions in which those rocks are found, and the nature of the materials of which they are composed.

Having thus given a summary sketch of the rocky strata, it becomes our next business to describe the general direction of the mountain belt now under examination. At the falls of the Shewanahegan the mountain formation may be said to commence. This range runs in a direction towards the River Ottawa; and from all the information obtained, passes between the Lake Masquinongé and the River St. Lawrence; running a few miles in the rear of Montreal, until it joins those hills which branch off near Grenville towards the east north-east. The country lying at the foot of these hills, between Three Rivers and the Ottawa extending to the River St. Lawrence, as well as that flat district forming the north shore of the Ottawa from the mouth of the River aux Lievres to the Lake of the Two Mountains, is, generally speaking, a good description of land, and bears fine timber. In this vast extent of low land, are found horizontal beds of limestone, containing remains of organized beings; and in some places there exist beds of a yellowish loamy clay. A great part of this tract is strewed with bowlders of various sizes; consisting of sienite and sienitic granite, similar to the rocks which form the hilly barrier to these low lands. The bowlders being found scattered over the stratum of secondary limestone is in unison with what Professor Buckland met with in many parts of Europe; and their occurrence in America is quoted by that able geologist as a confirmation of the fact, that the habitable portion of the world, in all quarters, has undergone a second and very recent general

deluge, certainly from the circumstance of these bowlders being commonly found lying on the secondary limestone, and the great size of many of them, it would appear that a body of water more powerful in its effects than the mere overflowing of a river, must have been the agent employed in conveying them to their present position :—and in this district there is abundant evidence of those waters having retired through the two great vallies of the Ottawa and St. Lawrence, of course subsequent to the deposit of the secondary strata. But to resume our description of the mountain range.

From the Shewanahegan falls, a hilly country continues to form the shores of the St. Maurice as high as Wemontachinque, with occasional intervening vallies of sand. In general an alluvial sandy flat extends from the foot of the hills to the margin of the river, varying in width.

By ascending the chain of lakes running in rear of Rat River Post, towards the westward, and branching off to the N. E. towards the River Vermilion, we ascertained the existance of the same primitive range as that forming the shores of the St. Maurice, and covered with a similar silecious sand. As far as the eye could command a view towards the west and south-west, we observed broken ranges of hill, generally dipping towards the St. Lawrence. On ascending the River Vermilion we again distinguished the same description of hilly country extending to the south-west for a considerable distance. On our right hand was a coresponding formation stretching to the east and north-east beyond the shores of the St. Maurice. Frequently the hills were fractured in an awful manner, exhibiting the bare and rugged front of stupendous perpendicular cliffs, several hundred feet in height. The summits of

these cliffs are covered with sand, and at their feet lay the large angular fragments of the rock, their angles slightly worn by the action of the air. From out of the crevices of these fallen masses grew small sized spruce, birch and poplar trees. One of these precipices, near a mile in length, was particularly remarked on the portage to Black Beaver Lake; and another was noticed near the Great Lake of the Coo-coo-cash, in a direction nearly south and east.

From the Coo-coo-cash to Wemontachinque, we could distinguish, on the west shore of the St. Maurice, similarly formed hills, with occasional precipices reaching far to the westward.

From Wemontachinque we crossed in nearly a direct western course, to the River aux Lievres. Our route generally lay at the northern end of the lakes which overspread the vast basins formed between the spurs of the mountains. These spurs have an almost uniform direction to the S. S. W.; although occasionally small ridges were seen to run in a contrary direction. Some of the lakes afforded an opportunity of examining that portion of the country seen from the River Vermilion: invariably it appeared to possess the same features as those portions we were traversing. It may not be unnecessary to remark that this chain of lakes lie in the mountain ridge forming a part of the lands height.

At length we descended the River aux Lievres in a generally south direction, and observed the mountain lands extending to the south and S. S. E., also on our right hand towards the north-west. In the descent of this river which wound its tortuous course through the vallies formed by the broken ridges of hills, we were again struck with the

appearance of immense inland precipices of sienite, fractured in the like extraordinary manner as those seen on the rivers and lakes explored in the first portion of the journey. At Lac du Sable we could clearly distinguish that the country to east and south-east was hilly and broken, and it was found the same for a distance of twenty miles below that lake. Here a subsidence in the rock occurs and the river falls over a precipice of about one hundred feet in height. From hence the hills appear to stretch more to the E. S. E. and we lost sight of them altogether a few miles below the falls; and the east shore of the river from thence, in general consisted of a flat sandy tract spreading in a direction towards Grenville.

About nine miles above its junction with the Ottawa the aux Lievres rushes over a bed of sienite, forming a series of splendid falls and rapids, surpassing in picturesque beauty, any thing of the kind we had before seen.

On the north shore of the River Ottawa we again fell in with the mountain range running parallel with the river in a south-east direction. These hills varied from several miles to a few hundred yards distance from the water side. Near Grenville this range appears to run towards the E. N. E. in a direction (as before stated) to join those hills which branch off from the River St. Maurice. It is between this mountain line and the St. Lawrence and Ottawa that the limestone formation is met with, covered with a good soil bearing fine timber. The principal places where the secondary strata was seen, were Grenville, on the Ottawa, and near the Gabelle Rapids on the St. Maurice; it is also known to exist at the back of Montreal.

Having thus shewn that the primitive range of hills, covered with sand extends far into the interior from the

Rivers aux Lievres and St. Maurice; that it also dips deep to the southward from the shores of the great chain of lakes lying between those rivers; and that it runs parallel with the Ottawa as far as Grenville, from whence it joins the chain extending from the Shewanahegan; we think it can scarcely admit of a doubt, but that the whole extent of country lying within that area, is of the same primitive formation covered with a silecious sand, as that which constitutes the mountain belt already described.

Were it necessary we could adduce many instances of a country similarly formed. We particularly remember one in Devonshire, England; in the district locally called the South Hams: this tract of country lies between the sea and the Dartmoor Hills, and is remarkable for its fertility.—About fourteen miles from Exeter is a flat called Bovey Heath, famed for the submerged wood, or Bovey coal.—This heath consists of an extensive bed of pipe-clay overlying the wood coal, and covered with a deposit of sand which forms the upper surface; if we except the thin layer of peat earth, the gradual accumulation of ages. Numerous flint quarries are found on the surface abounding in organic remains.

This extensive level is situated at the foot of the Dartmoor Hills, about five miles distant from the sea coast, and the intermediate space is occupied by a hilly country called Haldon, partly formed of sandstone and partly of lime rock, covered with a rich red loam.

The whole extent of the South Hams is about forty miles in length and of varied width, lying, as above observed, at the foot of a range of barren hills, and bearing a striking resemblance, in many of its most important features, to the country lying on the borders of the St. Lawrence and

Ottawa. It is likewise well known that the interior of the Dartmoor Hills, is equally barren as the external ridge, corresponding in that respect, with what we have endeavoured to prove as being the case, in the regions now under notice.

It only remains to say a few words on the agricultural nature of the soil prevailing in the district explored. The sand which has been mentioned consists of minute crystals of quartz, felspar of different colors (generally white or red), with, now and then, a small portion of hornblende, or mica, but no garnets except in the recent deposits round the shores of the lakes. The felspar sometimes occurs in a state of decomposition. This sand is mostly covered with a very slight layer of vegetable mould.

Sand, by itself, is well known as the very worst description of soil that can be met with, and totally unfit for agricultural purposes. From its loose silecious nature, it allows water to filter through it, and soon becomes dry; consequently the seeds, which have germinated while the soil was wet from the spring showers, become parched up, and perish during the summer heats. But sand mixed with calcareous earth, becomes more tenacious, and retains moisture for a greater length of time. On the other hand, if sand is mixed with clay, it renders it more loose, each correcting the faults of the other,—the sand by itself not retaining sufficient moisture for vegetables, and clay not allowing the small fibres of their roots to expand freely in search of nourishment. It must also be remarked, that a calcareous soil (like one composed entirely of sand or clay) is not in itself a good soil, but only so in proportion to the degree with which it is mixed with decomposed vegetable matter.

This we found fully exemplified in the beds of calcareous spar lying in most of the vallies in the lower parts of the River aux Lievres, where, owing principally to the deciduous nature of the trees, the vegetable mould occurs to a greater depth.

The decomposed particles of this calcareous rock, blending with the sand, has improved the soil so much, that it gives nourishment to a finer description of wood than is seen on the mountain heights; but still vastly inferior to the timber found on the alluvial deposits of rich land reaching from the foot of the mountains to the shores of the Ottawa and St. Lawrence.

When lime is mixed with clay (which constitutes marle) it is highly useful in the decomposition of decaying vegetable substances; hence its presence is necessary in the decayed animal and vegetable matter, which forms the upper stratum in the forests of America. It is ascertained that a very small proportion of vegetable mould is necessary to form a calcareous strata into good soil, as is sufficiently proved in the numerous instances of sand abounding with fragments of shells, bearing fine crops, with scarcely any covering of vegetable earth. From nearly a similar cause, the timber on the lower parts of the aux Lievres is so much finer than on the shores of the St. Maurice, or Great Lakes, where no calcareous spar made its appearance.

Yet after all the depth of vegetable mould is of primary importance; and in this particular the district in question was miserably poor, for it was rarely a strata of mould was found more than half an inch in depth and frequently not so much. This is to be attributed to the peculiar nature of the spruce and other trees of the pine species not being deciduous:—but where the young groves of birch and

poplar abound, the annual accumulation of their decayed leaves, mixed with the putrid remains of the myriads of insects and animals, all of which assist in the decomposition of vegetable matter, a thick and rich strata of earth, closely resembling, what by horticulturists, is termed garden mould, will in time be formed. But even in the richest districts of Canada we find the virgin soil soon become exhausted, and requiring an admixture of calcareous matter to assist in the decomposition of the stalks and other remains of vegetables it has formerly borne. It is well known that vegetables buried in a green state, remain in the ground inert for a greater length of time than when mixed with some more active decomposing matter.

At the posts of Rat River, Wemontachinque and Lac du Sable, where a portion of land has been some years in cultivation, the soil is nearly exhausted; so much so, that out of a large field of Indian corn which was sown two years since, at the first mentioned post; not more than twenty stalks have made their appearance, although the seed was said to be excellent. At Lac du Sable the corn bore only one ear on each stalk: and all other vegetables, (except pease,) have yeilded but poor crops for the last two or three years; however, by a judicious application of lime the quality of the upper surface may be restored.

Unfortunately the prevailing timber in these sandy regions being evergreen, the accumulation of vegetable mould must of necessity be remarkably slow; and an incalculable period will elapse, ere the land in this district can be fit to receive the needy settler who depends upon the produce of his land alone, for subsistence.

We now beg leave to conclude, only regretting that a limited experience prevents our treating this interesting

and important subject with the science it deserves; and resting in hopes that some future explorer will throw a more beneficial and instructive light on this branch of agricultural geology, as far as concerns the interior of this Province.

On some PROCESSES *in use among the* HURON INDIANS *in* DYEING, *by* W. GREEN, *Esq.*

AMONG the Hurons of Lorette, the females exclusively practice the art of dyeing.

The substances which are the subjects of their art are chiefly porcupine-quills, elk-hair and leather.

Their *red* is extracted from the root of *tsa-voo-yan, (galium)*. The spike which consists of the seeds of the sumach with their pericarp and the stalks to which they are attached, are washed in cold water to clean them. They are then boiled in soft water. When this water has become of a deep brownish red, it is strained through flannel. The root of tsa-voo-yan pulverized is infused in the sumach water. The porcupine-quill or elk-hair is then introduced, and the temperature gradually raised to the boiling point, and there sustained a quarter of an hour. It is then taken out and rinced in soft water, and then it is soaked for a short time in weak soap and water. It is then washed in pure water warm. The red thus dyed is a deep scarlet and durable. For lighter tints the time

of infusion is shorter. The subject is then wrapped up in flannel and dried. When so dried it retains its roundness. Had it been dried in the open air, even without light, it would have become flattened and contorted.

Their *yellow* is of a pure hue, rather pale and very durable. The seeds of ootsigooara osookwa, (*myrica gale,*) are pounded and mixed with water, and boiled for a quarter of an hour. The porcupine-quill or elk-hair is then introduced and the ebullition continued for another quarter of an hour. It is then withdrawn and washed in soap and water and then in pure water. It is then dried with the precaution mentioned in the former case.

Their *blue* is extracted from green baize. The baize is boiled in pure water. When the water has become of a deep blue the subject is introduced together with a little alum in powder. They are then brought to the boiling point, and the boiling is continued a quarter of an hour, when the subject is washed in pure water. It is *essential* that the baize be old, or have been much worn. It then retains its yellow and parts with its blue in this process. But if the stuff be new, it parts with both these colours. The blue dyed by the Indians of the interior is deeper than the above, and is said by the Hurons to be derived from indigenous plants, no longer known to the latter.

Green is dyed by boiling a subject previously dyed yellow, as above, in the blue decoction above described.

Brown is dyed with the husk of the butter-nut, (juglans cathartica.)

Black, with the husk of that nut, or with the bark of alder or of maple, with sulphate of iron. If with the first the black inclines to brown, if with the second it is purplish, and bluish with the last.

In all their dying processes the Hurons avoid bringing iron into contact with their materials, and use vessels of polished copper.

Sketches of the TETE DE BOULE INDIANS, *River St. Maurice, by* J. ADAMS, *Esq.*

ANY information relating to the primitive manners and pursuits of the aborigines of this country, which are now fast giving way before the strides of civilization, must in some degree be interesting to the society which I have the honor of addressing; and however incomplete and partial those notices, which the brief opportunities of a very hurried progress through the tract to be spoken of, alone permitted me to make, particularly as another and paramount duty necessarily occupied nearly the whole of my attention.—Still, I consider that in some degree, the few scanty facts, which chance or enquiry threw before me, will not prove unacceptable; especially as the race to which they apply is now nearly extinct, as a nation, and what yet remains of their habits, is fast fading away into that obscurity which has excluded the histories of many early people from the book of record, and thereby deprived philosophy of the means of tracing the moral progress of man from his savage infancy, through the periods of improvement, maturity and decline, to the last melancholy state of consummated social decay.

Such, in so far as relates to the earliest portion of their history, has been the fate of Greece and Rome, not to ascend

to the remoter eras of African and Asiatic national infancy, or even to the meridian splendor of many of their empires. The efforts of gigantic learning have been foiled in attempts to tear away the veil of concealment from the picture of the early times of even these comparatively modern states; and in lieu of a well defined though distant view of what they were, and how they had risen gradually from barbarism to perfection, it is altogether confused or lost; and our earliest historical records place them before us in a situation elevated far above primœval habits :—barbarous and rude, it is true, in their customs, but builders of ships and of palaces; skilful fabricators of steel and of clothing, and organized, at the time of our first acquaintance with them, into monarchies and political combinations much advanced beyond what we can imagine to have been then, as is now, the condition of primitive natural man.

What an interesting relique would it not have been to after ages, had some traveller—some eastern Strabo or Herodotus visited Greece or Italy ere they had emerged from a state of savage life; observed closely their customs; gathered their religious or historical legends, and disclosed them to the world in the Hebrew language. What light would not such a single work have thrown upon the naked outline of their splendid mythology; and what volumes of condensed laborious research and conjecture have been spared by the bare recital of perhaps a dozen facts, upon which were subsequently heaped the gorgeous apparel and imagery of immortal poetry—delighting and dazzling the mind, it is true, with fine imaginings, but at the same time hindering, or distracting it from the less pleasing contemplation of plain unornamented historic reality.

But, it may be enquired, would the advantage derivable

from such an acquaintance with truth have been commensurate with the gratification afforded by the perusal of the sublime poetical perversion in part founded on it; or of the yet more enticing aberrations of eloquent historians, glad to make it the vehicle of more imposing, because less suspected, natratives? I should answer *yes*;—and if called upon to substantiate the assertion, point out as an example, the historical dramas of Shakspeare; which, however known to the critic to be *false history*, possess not the less influence over his imagination, even in the closet. The interest excited in the mind by the desire of learning plain truth, and that caused by the semi-transparent fictions of fine poetry, grounded on reality, are different passions congenial with the same mind. Nor, to illustrate the sentiment by a remark somewhat bearing upon our subject, do we less admire the fine poetical draught of Indian character developed in "The last of the Mohicans," because we may have closely seen, in some of our excursions, the real native savage in his homely, dirty blanket garb, and perhaps at a time when labouring under the effects of the least poetical of his customary inclinations.

Passing immediately to our subject, the nation of the Tête de Boule Indians, inhabiting the country around the upper part of the River St. Maurice, and concentrating towards Wemontachinque, as the mart for their hunting produce, is that on which these observations are principally intended to be made. These people, once a formidable race, are now reduced by small-pox, and more especially by the baneful effects of rum, to a miserable remnant of some twenty or twenty-five families, spread over an extent of country, measuring probably seven or eight hundred square leagues, and considering all this great tract as their own lawful

hunting ground; the lakes and rivers intersecting which, are portioned out amongst them, partly by the exertion of their own individual strength, and partly by a kind of feudal grantage from those of their own tribe, in whom they acknowledge some undefinable superiority. This latter at least I suppose, as a young Indian who, at one time, accompanied the St. Maurice exploring expedition as a guide, seemed desirous of obtaining an allotment of hunting ground for himself, and informed the party that it was a necessary preliminary to secure the permission of some chief, who he named, as a paramount Lord of the soil. I believe this young man himself was not a Tête de Boule, but the same custom prevails among the Indians of that nation.

Whatever rank they may formerly have held as a tribe of hunters and warriors, the Tête de Boules of the present day exhibit a melancholy portraiture of degraded human nature. Slaves of the fur traders, by the expenses incidental to their acquired taste for ardent spirits, they are seldom so independent as to be able to carry their furs to other markets than the neighboring posts; and indeed, are generally so much in debt for clothing, arms, ammunition, and provision, independently of rum, to both companies, where there is an opposition between the Hudson's Bay and King's Post agents, that each of these companies have their parties of people constantly engaged running about in small, light birch canoes, searching for Indian encampments, and taking from them whatever *peltries* they find them in possession of, giving them, in return, some rude token or tally, well understood by both parties as a receipt for the value; nor does it appear that the Indians often make opposition to this rather arbitrary method of trading,

I was even informed that should these *engagés* of the fur companies, find parcels of furs at an encampment when the owners are absent, they will seldom scruple to take them, and leave a tally for the amount, indicating to which of the posts they are indebted for the kindness of saving them the trouble of carrying their own goods to market. The men employed to visit the Indians in this manner are always Canadians, or half-breeds, and mostly daring fellows and skilful *voyageurs;* they are known by the (*patois*) appellation of Gens Derrouine, and they always put me in mind of bees returning to their hives, or posts, laden with plunder, and ready for another excursion, as soon as they have safely deposited the treasure with which they were laden.

From the personally distinctive title bestowed upon this race, I had expected to see their heads very remarkably shaped.—This is not the case. I do, indeed, acknowledge that the prominent parts of their cheek bones are somewhat more broadly apart than usual, but by no means so conspicuously as to authorize the peculiar nick-name by which they are distinguished. The young people are generally good looking; and a family of children which we met with were, I believe, unanimously considered by the party, to have fine intelligent countenances. Nor did advanced age seem to destroy their claim to general appearance. We saw men and women of twenty, forty, sixty, ninety, and one hundred and ten years, and to the best of my judgment, as personable at those respective ages, as other classes of Indians, at least such as it has been my chance to fall in with. I cannot help quarrelling with this ridiculous title of Tête de Boule, as in the first place, it led me astray, in supposing that I was about to

behold a set of people with heads as round as pumpkins, and because, if intended originally as a caricature, its merit is very mean, from its failure in off-hand resemblance to reality.

It is difficult to say what are the distinguishing moral traits which separate the Tête de Boule tribe from other Canadian Indians, and create them a peculiar race from natural habits. So much has, and so ever will, an intercourse with white traders tend to annihilate or deface the delicate differences of Indian caste, only to be discerned where

"Man, a NOBLE Savage, walks the woods."

The general impression made upon my mind from accounts of the most apparently uninfluenced and natural actions of the Têtes de Boule was unfavourable. Manifold instances of rapine, treachery and murder in their social intercourse were related to us with stoical indifference by our guides and other informants, who only seemed astonished that we should expect to hear any thing better of a race of people, which they themselves so much despise and look down upon. The actions to which I allude were such as were performed amongst themselves (of which I mean to relate two or three in the sequel,) and may therefore be considered, as rather more accurate tracings of their native savage character, than excesses occasioned by immediate drunkenness, or conflicts between them and the emissaries of trading posts may be supposed to exhibit. But few redeeming traits were made known to us, nor can I call to mind more than one instance which was calculated to convey an impression of Indian single heartedness or untutored kindness such as we often meet with in Hearne and in the books of other travellers, who have described the more distant

and more independent tribes of savages : that one shall be mentioned in its proper place.

Their religion is a Paganism, the leading features of which I did not learn ; neither from the ignorance or indifference of our guide on such matters, could I ascertain whether they have any idea of a future state. The good and bad spirit, and probably a plurality of each, they acknowledge in common with other Indians. Superstitious, they undoubtedly are, for beside the graves of their dead, which are very neatly enclosed by walls and covers of birch bark, we always found, independently of the representation of their weapons (if a chief) sword, spear, bow, arrows, &c. a parcel of firewood lying, ready for the use of the occupant could he require it. Of another kind of superstition, we also witnessed some amusing specimens developed before us by Robert M'Vicar, Esq. a partner of the Hudson's Bay company, at his post of Wemontachinque. This gentleman (the friend of Captain Franklin,) besides a very long experience of Indian habits in the N.W. country possesses the advantage of considerable dexterity in slight of hand performances ; and has established his fame as a great conjurer in the minds of these poor savages. The manner in which he one evening worked upon the feelings of two women and a boy, by some displays of this kind, and the absolute command he apparently possessed over their faculties from superstitious awe of his power, though it made us smile, yet I believe affected every one of us at the same time with pity approaching to sadness, that the human mind should even any where be found so prostrated as to be duped by such flimsy deceptions.

But these poor Indians themselves are possessed of no mean talent as masqueraders, of which I will relate an

instance. One evening while residing at the same post, the party were intruded upon by two of the most frightfully distorted and disgusting figures I have ever seen, in the persons of two old men—lame, hump-backed, blackened with gun-powder, and with white teeth protruding from the upper jaw downwards, at least two inches; they were represented to us as idiots and brothers, and seated themselves in the room, making violent gestures, expressive of anger or impatience, and at intervals furiously striking the floor with their paddles. Having been previously prepared to expect a singular arrival at the post on that evening, and the agents of the conspiracy against our discernment having well performed their parts, two of us were deceived, Mr. Ingall alone being sceptical. I myself doubted them at first, but in the end I confess myself to have been taken in by their inimitable acting, as on one of the servants of the post pretending great alarm after they had retired into the next room, and running into ours', apparently for protection, I seriously asked him whether he was so cowardly as to be afraid of such poor decripid creatures. These two worthies were handsome lads, the eldest not more than seventeen, and sons of an old Canadian hunter, named Flamand, by his wife, a Tête de Boule woman.—The teeth they had cut out of wood, and so fixed them as to resemble the long, curved upper cutting teeth of a beaver. Never was deception more admirably managed.

The Têtes de Boule Indians are very dirty in their domestic habits, and in respect to their cookery, I shall not easily forget peeping into one of their kettles, and observing a large pike, so nearly done, that the bowels and bladder had forced their way through the body; but this mode of boiling fish is, I believe, not particularly

confined to their tribe. I saw no specimens of fine Indian work done by the women; their moccasins and clothing were quite unornamented; nor did I notice any of those fine dyes or extracts which have been brought to so much perfection amongst other Indians. The needle work of the *squaws* is, however, strong and good, and a blanket coat, which was made for me by one of them, is by no means devoid of neat taste, in the ornamental blue seaming which she thought proper to introduce. The materials of their own clothing are always obtained at the posts, and are made up by them in a plain but not unbecoming fashion. I saw only one display of extra finery, and that was on the person of a lady about forty. She was the wife or daughter, (I forget which) of an old chief named Majeshk, and on paying us an introductory visit at one of the lakes, came enveloped in a dashing green table cover, with yellow centre and edges. But alas! on returning this visit rather unexpectedly, we found this laid aside, and the same personage wrapped up in one of the filthiest blankets it has been my lot to behold, even on Tête de Boule shoulders.

It would be unjust to omit mentioning here, that, from the family just spoken of, (the only one we met with "at home," as it were,) the party experienced great hospitality. Thrice they made us acceptable presents of fine fish, sufficient, on two occasions, for all the people; and as they knew we had no rum, the first article they enquired after on visiting us, I am happy in believing that these supplies were given to us from a motive of disinterested kindness, which we repaid to the best of our ability. This is what I alluded to a page or two back.

It now remains for me to endeavour to sketch the characters of two remarkable chiefs, one of whom alone we

met with. The other, a very extraordinary man, who seems to stand distinguished from all his tribe, we only heard of through the medium of our guide, who had long known him personally.

Old Majeshk, the first of these chiefs, is supposed to have reached the age of one hundred and ten; he is nearly blind, but otherwise in the possession of his faculties, and still paddles in the bow of his canoe. He has been a tall strong-built man, but is now considerably bent, and appears to walk feebly, although this may be merely a natural hesitation, occasioned by the defect of his eyes. Of this man we had heard much while ascending the River St. Maurice, and even that he was a cannibal; this last, however, the same guide afterwards recanted, asserting that we had not understood him, but repeating that he had at different times destroyed several Canadian hunters. This chief, in his prime, was an ambitious and successful warrior. By his personal enterprize and bravery, he conquered all the Indians who had settled on the parts comprehended between the aux Lievres lakes and the Lake Shosawatasi, an extent from west to east, of about seventy miles, and at a time when the numbers of the Tête de Boule nation were much more respectable than they are at present. It is impossible to ascertain how many he destroyed in these invasions, but tradition makes the loss of lives very serious. All these lakes and waters he has since kept firm possession of, portioning off parcels of them at different times to the members of his family, as they grew old enough to hunt for themselves: but it appears that he has never been disturbed by an enemy invading his acquired dominion.—We endeavoured to fix his real age, but for want of numerical calculation among these people, our nearest approach

to accuracy was learning that he remembered the English conquest, and that he had then been some years a married man. Indian tradition gives him about one hundred and ten years, as before remarked, and his appearance does not disprove the estimate. He now lives on the borders of Lake Mangemagooz, and is taken care of by his daughter and son-in-law, and by a wife about forty years of age, to whom the old gentleman was, as we learned, wedded about twelve months before we met with him. A fine boy, of about seven, we were informed was his son by a former wife; but we observed no appearance of any further probable increase to his establishment.

The other chief of whom I have to speak, is a much more extraordinary person, and the accounts which we were continually listening to, had greatly excited our curiosity to see him, in which expectation, as I before noticed, we were disappointed, but have since had good reason to believe that he was not unobservant of *our* motions. This man's name (almost Italian) is Menessino, and he is son to old Majeshk. His usual residence is on the shores of Lake Kempt, the largest expanse we discovered, and almost a water labyrinth, from the extraordinary shapes of its deep bays, its narrow straits, and numerous large islands. Here lives Menessino, with his wives and children, in solitude, for he is a murderer proscribed by the law, and seldom ventures to leave his haunts to visit the post of Wemontachingue. At one time he was pursued and secured, by an officer sent up purposely from Three Rivers, and who was conveying him down the St. Maurice for trial, when, at La Tuque (I believe), on that river, he seized an opportunity, although handcuffed, of plunging in below the rapid, and swam over to the other side in

safety, leaving the constable only able to wonder at his escape; as the canoe had not been brought over the portage, and he in consequence could not pursue him, Menessino easily found his way back to his lakes.

In person, he is described as a tall, active, athletic man, with an expression of countenance not unpleasing, but even indicative of mildness and quietude. Under this calm exterior is, however, concealed a disposition to cruelty and violent passions, which renders him fearful to all when excited by anger or jealousy. Our guide's rude draught of him, reminded me somewhat of Byron's Corsair, dark and dangerous. Two wives have died by his hand; the grave of one we visited on the shores of Lake Kempt—he killed her in a paroxysm of anger, by cleaving her head with an axe. The manner in which he destroyed the other I do not remember. Strange to relate, the place where he has chosen to bury the first unfortunate woman, seems to be a favorite spot of the murderer, for there we found his bath and summer cabin, which the guide told us he is accustomed to inhabit. On the same spot are also two other graves, one filled by his own mother, who was murdered on a sand-beach of Lake Malawin, by the hands of Menessino's daughter, her own grand-child. Our guide was present when this unnatural murder was perpetrated. He and another were crossing Lake Malawin, on a "derouine" excursion, when observing two women fighting on the sand, they approached in their canoe, and found they were the mother and daughter of Menessino, who himself was seated by coolly looking on and smoking.—The Canadians expressed a desire to separate them, but Menessino forbade them, and said "let the women fight." The next minute, our guide saw the young girl get the

head of her antagonist under her arm, and twist it round, when the old woman fell dead. Her body was then conveyed more than forty miles by Menessino to the burial place which we visited. The remaining grave there found is that of a child who died naturally. Nothing can surpass the neatness and care with which these graves are covered and defended from the attacks of wild beasts.

Another striking characteristic of this Indian, is, that he never, like others, was in the habit of intoxicating himself at the posts with ardent spirits. Whatever he required he took with him to his lakes. Among his other peculiar whims, Menessino at one time insisted on having a wooden boarded real house, built for him by the Hudson's Bay Company, on a point of Lake Kempt, under penalty of carrying his furs elsewhere; and this was actually done, all the timbers, &c. being conveyed from Wemontachingue, if I remember rightly. This building we had a great desire to see, but the guide pretended that he could not find it while in Lake Kempt, though he said he had several times been at it, and really had so. Since our return to Quebec, this mystery has been cleared up by M. Vassal, of the K. P. C. who arrived after us. He said at once that the guide *must* have known the spot, and was probably afraid of offending Menessino by discovering to us his retreat, as from our description we must have dined on, or very near the point where the house is standing, some way back among the trees. Here, then, is another proof of the reverential awe which this chief has spread around him.—Why the fur traders have so long refrained from securing and delivering him up to justice, I know not—it may be no concern of theirs', and Menessino is the best hunter of all the tribe of Tête de Boules. On one occasion two

Canadians undertook to seize and carry off Menessino from his lake. They tracked him into one of its deep bays, which we were shown, and whence they concluded he could not escape. Menessino was, however, aware of their intention; he left his canoe, and stealing along among the trees, the wary Indian took deliberate aim at the men, as they were cautiously passing, and killed either one or both on the spot; at all events, neither returned from the lake, if my memory is correct.

But it is now time for me to leave this extraordinary character and indeed to close this paper. I will, however add, that for several years no communication has existed between this lone man and old Majeshk, his father. He had some years ago a half brother, whose grave we visited on Lake Nemicachingue, a murderer also, whose catalogue of crime exceeds in horror even that of Menessino, and who himself was at length destroyed by another Indian, whose wife he had repeatedly endeavoured to carry off, and three times attempted to murder the husband.—In the last of these encounters (a dreadful one) Menessino's brother was at last killed by a blow from the axe of his enemy, and the ruffian lies buried on the very spot where, seven years before, he had shot a Canadian woman in cool blood, and afterwards dashed out the brains of a poor child on a rock hard by, who had witnessed the deed; the little fellow lies buried very near the grave of his brutal murderer. Fear of Menessino obliged the Indian who, in self defence, had killed his brother, to leave that part of the country, and he has ever since remained an *engagé* at Lac du Sable post, whither the other has never thought fit to follow him.

Such are some of the lawless acts that have been perpetrated in that wild region, where human life seems scarcely

to be valued at "a button in a man's cap." Nor will they probably be the last of the same kind. There is no exaggeration in this sketch—I have merely repeated what I heard, and which, for the most part, the corresponding testimony of different persons tended to corroborate.—Indeed what I have penned bears so small a proportion to the mass of information of the kind given to us, that my most difficult task has been to condense what I have heard related, so as not to run the risk of proving very tiresome to the society, and in consequence I have been obliged to omit much of what, to myself, appeared interesting enough. I will conclude by observing that, should these slight remarks on the Tête de Boule Indians, induce a desire for more particular information concerning them, I know no one so well qualified to complete a more perfect account of them, from constant and well directed enquiry, as another member of this society, my respected companion on the late expedition, Mr. Nixon, of the 66th regiment.

Notes on some of the PLANTS *of Lower Canada, by* W. SHEPPARD, *of Woodfield, Esq. V.P.*

Read 19th December, 1829, and 19th January, 1830.

In laying before the society, a few observations made on some of the vegetable productions of our neighbourhood, I have to crave your indulgence for taking up your time on a subject of but partial interest. The acquisition of knowledge in the various branches of Natural History, I regret to say,

has not hitherto been pursued here so generally as in Europe, and elsewhere. From the establishment of this, and our sister society in Montreal, I doubt not will date a new era in knowledge in these provinces. To these societies, as centres, will naturally converge, from various quarters, facts in science, and discoveries in the arts, which might otherwise never be made known to the world. Encreased facilities in the acquirement of useful knowledge, will necessarily grow out of these establishments.

In these notices I do not profess to follow the regular order of succession of the vegetable families, but will select them so as to create, if possible, some interest, by contrasting trees with grasses—the useful with the ornamental. I do not presume to write for your instruction, much less do I expect that the notices which I am about to offer will excite any interest beyond what I may hope from your indulgence. If I succeed in creating in the younger part of my friends, a taste for this pleasant branch of Natural History, I will be quite satisfied—it is my only aim. An opportunity will soon be given them, I fully trust, to follow up the pursuit, by attending the lectures about to be instituted under the auspices of this society. Summer is, beyond doubt, the most suitable season for pursuing these enquiries, and will in all probability be chosen for the lectures. The trees and shrubs are, for the most part, now divested of their ornamental clothing, and the humble herbaceous plant is retired out of sight, for a long and necessary repose after the summer's excitement and exercise of functions. Few living plants can therefore be produced in illustration of these notes. I am induced by this circumstance, to make choice of a natural family to begin with, composed principally of evergreens.

Family—CONIFERÆ.—JUSSIEU.
Genus—*PINUS.*—*L.*
Section—*SPRUCES.* Leaves solitary.

Pinus balsamea—L. Abies balsamifera—MICHAUX.
Balsam Spruce. *Sapin.*
"Leaves flat, grey beneath. Cones cylindrical, erect."

This is a beautiful evergreen tree, rising in a pyramidal shape to the height of thirty feet or more. In open and cultivated grounds, it becomes feathered down to the surface, and is a very pleasing object to contemplate; it is in consequence, in much request for shrubberies and park scenery in Britain. This is the tree which produces the Canada Balsam, well known to practitioners in the healing art. It is found in small blisters in the bark, whence it is extracted by incision, and received in a limpid state into a shell or cup. The best varnish for water-colour paintings is prepared fromthis liquid resin. This spruce is common about Quebec, and throughout Canada; but I do not find that the timber is applied to any useful purpose.

Pinus Canadensis—L. Abies Canadensis—Mx.
Hemlock Spruce. *Pruche.*
"Leaves flat, denticulate, two-ranked. Cones ovate, terminal, as long as the leaves."

A large tree, with beautiful foliage, vying in magnitude with the white pine. The timber enters not into commerce, except in the shape of lathwood, of which a considerable quantity is yearly shipped to Britain and Ireland: it is however, sparingly used here in rural architecture for coverings of roofs and for weather boardings. The bark is used by the country tanners in the manufacturing of leather; it is said to possess a large proportion of the tanning principle. The leaves have the flavour of juniper

berries; they are sometimes used by the country people to make a *ptisanne*. The tree is ornamental and might be admitted into park scenery with advantage. It is not common about Quebec, but abounds in various parts of Canada, in dry sandy soils.

Pinus nigra—Lb. Abies nigra—Mx. Black Spruce. Double Spruce. *Epinette noire.*

"Leaves four-sided, scattered on all sides of the branches, erect, straight. Cones ovate; scales oval, with undulated margins, close-toothed at the apex."

A middle sized tree, tall, straight and taper. The foliage dense and having a very dark appearance. Whole tracts of swampy country are frequently covered with this and some other evergreens, which give them a dismal cast compared with adjoining growths of trees on undulating grounds: those tracts are hence called blackwood lands. From the spray of this tree is extracted the essence with which that wholesome beverage spruce beer is made. Of the timber is manufactured deals for exportation; large quantities are yearly shipped at the port of Quebec, principally to the Irish market.

Pinus alba—Lb. Abies alba—Mx. White Spruce. *Epinette blanche.*

"Leaves four-sided, incurved. Cones nearly cylindrical, lax; scales obovate, entire."

A tree similar in appearance to the preceding, except that the leaves are of lighter green, and not so thickly set. It grows on dryer soils. The timber is white and is also manufactured into deals, scarcely to be distinguished from those of the black spruce. Manufacturers are acquainted with several varieties of this tree, occasioned by the different nature of the soil: such as *epinette grise* and *epinette*

tremblante; the latter is preferred in point of quality. The timber of the black and the white spruce resembles in appearance, and probably in quality, the white deal of the north of Europe, which is made from *Pinus Abies;* whence, no doubt, arises the foreign demand for our spruce deals. Spars for the higher yards and for top-gallant masts, are frequently taken of this timber by reason of its comparative strength and lightness. The Indians collect from this tree principally, the gum with which they pay the seams of their bark canoes: it exudes on the surface, at the knots and wounds, whence it is taken and melted to free it from impurities.

Lambert makes another species of spruce here, which he names *Pinus rubra;* but Michaux is not willing to adopt it, and says it is only a variety of the alba; perhaps one of those mentioned.

*Section—*PINES. Leaves in twos, threes, or fives in a sheath.

Pinus resinosa—AIT. Pinus rubra—MX. Red Pine.

Pin rouge.

"Leaves in pairs, elongated. Cones ovate-conic, rounded at the base, about half as long as the leaves; scales dilated in the middle, unarmed."

A handsome tree of large growth. Bark scaly and of a reddish colour. The timber of this pine enters largely into commerce, principally as squared logs of from ten to sixteen inches, or more, of a side; also as spars for masts and yards, for which purposes it is in great request. Some deals are also manufactured from it, and great quantities of lathwood; for the latter purpose it is well suited, its great strength enabling it to support the weight of the slate and tile roofs of Britain. This wood is much used here in ship-building, for planks, spars, &c. being strong and durable.

Towards the sources of the Ottawa large tracts of sandy land are entirely covered with red pine; from which country we principally derive our supplies of that kind of timber. It also grows about Quebec, and is more or less scattered throughout the country.

Pinus banksiana—Lb. Pinus rupestris—Mx. Gray Pine. *Chipré?*

"Leaves in pairs, short, rigid, devaricate, oblique, recurved, twisted; scales without prickles."

A small tree varying from a few feet in height to thirty feet, according to the nature of the soil. It is rare in the southern parts of the province, but abounds in the north. Capt. Franklin mentions it as growing in a high latitude. There is a solitary locality of this tree at Sillery; near the highway to Cap Rouge: it is also found at Three Rivers and at St. Paul's Bay.

Pinus rigida—Lb. Pitch Pine.

"Leaves in threes, in short sheaths. Cones ovate; scales with reflexed spines."

A tree about the size of red pine; found very sparingly in Canada, but grows in abundance on the shores of Lake Champlain. No locality is known near Quebec. The timber resembles red pine, but abounds more in resin; it is sought after by pump-makers. Tar and lampblack are manufactured in Vermont by very simple processes. The knots being incorruptible, are found abundantly in groves of this pine, frequently under ground, where they have lain for ages; these are collected and piled upon a stone hearth, covered over with sod and earth, and set on fire, in the manner of making charcoal. The heat produced in burning causes the tar to leave the knots, and flow over the hearth by a groove cut in it for that purpose. Lampblack

is nothing more than the condensed smoke of the same fires, collected in large wooden receptacles.

Pinus serotina—Mx. Pond Pine.

"Leaves elongated, in threes, Cones ovate; prickles of the scales straight and very slender."

Not having seen this pine, I merely record it as a native of Canada, on the authority of Purch, who says, in a manuscript note in my possession, that it grows at Anticosti.

Pinus Strobus—L. White Pine. *Pin blanc.* Yellow Pine of commerce in England, and Weymouth Pine there in its growing state.

"Leaves in fives."

This is the most majestic of all our pines; in suitable soils attaining a great size, and towering over all the other trees of the forest. When growing in open situations; it is usually feathered down to the ground, assuming a picturesque appearance, especially when loaded with its large pendulous cones. White pine is easily wrought, comparatively free from knots, and durable in all situations: it is, in consequence, used by our carpenters and joiners almost exclusively in the construction of houses and other buildings. Masts of large ships are usually made of this timber, and frequently their decks also; the property of not splitting by the sun in warm climates fitting it for the latter purpose, its great size and lightness for the other. This wood is an extensive article of commerce, and of export from these provinces; being shipped in the shape of masts, plank, boards, shingles, square logs, and sawed scantling. The quantity of this timber exported yearly, far exceeds that of any other kind. It is the most useful, and fortunately the most plentiful timber we possess, being found generally throughout the province.

Section—Larches. Leaves in bundles.

Pinus pendula—Lb. Black Larch. Tamarack. *Epinette Rouge.*

"Leaves deciduous. Cones oblong; margin of the scales bent in; bracts fiddle-shaped."

A tall taper tree, growing about Quebec, and throughout Canada. The timber is straight grained and strong, fitting it for the spars of ships, but inferior to white and black spruce for this purpose, on account of its greater weight. It is also used in ship-building, principally for knees to fasten the beams; the but of the stem and one of the principal roots, forming together the angle required, are taken for that purpose—these knees are strong and very durable. The wood burns briskly and furnishes a great and sudden heat; for which qualities it is in request as fuel for the steam engines on the St. Lawrence.

Pinus microcarpa—Lb. Red Larch or Tamarack. *Epinette rouge.*

"Leaves deciduous. Cones roundish, few-flowered; scales reflected; bracts eliptical."

This larch so closely resembles the preceding in habit and qualities, as scarcely to be distinguished from it; except botanically. Michaux makes but one species of them, under the name of *Larix Americana.*

JUNIPERUS.—L.

Juniperus virginiana—Wm. Red Cedar. *Cèdre rouge.*

"Leaves in threes, adnate at their bases; in the young state they are imbricate; older, they become spreading."

A small evergreen tree, growing abundantly on the shores and islands of Lake Ontario; but very sparingly in Lower Canada; the only localities of its growth in this province, that I know of, are at the falls of the Chats and

the Chaudière on the River Ottawa. In Upper Canada and in the States where it is plentiful, it is used for fences; being superior to every other kind of wood in point of durability in such exposed situations. It is occasionally brought to this market in round logs of about twenty feet long, and eight to twelve inches in diameter: but is seldom exported to Great Britain, owing to an enormous duty levied on it by weight.

Juniperus communis depressa—L. Juniper. *Genevrier.*

"Leaves in threes, spreading, mucronate, longer than the berry."

A low spreading shrub, about two feet high and extending over a large surface. The berries might be collected for the use of the distiller, as are those of the European variety of this species. Grows on the shores of the St. Lawrence below Quebec, and at the falls of the Ottawa.

Juniperus sabina—L. Savine. *Savin.*

"Leaves opposite, obtuse, glandular in the middle, imbricate four ways, delicate, acute, opposite."

A low decumbent shrub, about six inches high. The elder Michaux found it growing in clifts of rocks, from Hudson's Bay to the mouth of the Saguenay.

THUYA.—L.

Thuya occidentalis—L. Arbor vitæ. White Cedar. *Cèdre blanc.*

"Branchlets two-edged; leaves imbricate four ways, rhomboid-ovate, closely pressed, naked, tubercled. Cones obovate; inner scales truncate, gibbous below the apex."

Grows generally in moist grounds, and on the sides of hills; attaining a large size in favorable situations. The timber has the lowest specific gravity of all our Canadian kinds of wood, and is remarkable for its durability: on these accounts it is in great request here for fencing: thus

exposed to all weathers, the timber will last half a century. Builders use large logs of this wood for cellar beams, being little acted on by the moisture of such situations. It likewise rives freely, and is much used here for shingles and laths. The Indian uses it for the ribs of his frail bark canoe.

TAXUS.—L.

Taxus Canadensis—Wm. Taxus baccata minor—Mx.
Canadian Yew. *Buis.* Dwarf Hemlock.

"Leaves linear, two-ranked, margin revolute."

A recumbent evergreen shrub, rising obliquely to the height of four or five feet. In foliage it resembles spruce, from which circumstance the Americans call it Dwarf Hemlock: a reason for the Canadian name of *Buis* is not apparent; it certainly has little resemblance to box. The berry is quite similar to the fruit of the European species; and there is a variety with berries perfectly white, growing in the ravine between Wolfesfield and Spencerwood.—Common in shady woods and north sides of hills.

The recumbent habit of this plant and of our variety of the common juniper, may possibly be occasioned by the weight of snow lying on them, during nearly one half of the year.

LILIACEÆ—Juss.

LILIUM.—L.

Lilium Philadelphicum—W. Philadelphian Lily.

"Leaves in whorls, lance-linear. Flowers erect, bell-shaped, spreading; petals with claws."

A handsome bulbous plant, about two feet high, bearing one or two erect flowers at the summit: petals red, and marked below with dark spots. This lily resembles in some degree the common orange lily of the gardens, but is not

so strong a plant, and seldom bears more than two flowers. It grows in the upper part of the Province, and on the shores of Lake Huron.

Lilium superbum—L. Superb Lily.

"Leaves lance-linear, three-nerved, smooth; lower ones in whorls, upper ones scattered. Flowers in a pyramidal raceme, reflexed. Petals rolled back."

A stately plant, five or six feet high, bearing a large pyramidal bunch of flowers at the summit, frequently as many as thirty on a plant. The flowers are orange-coloured with dark purple spots. This plant grows in overflown grounds in Upper Canada, and on the Island of Montreal. It is one of the most showy of our natives and merits a place in all collections of flowers.

Lilium Canadense—L. Canadian Lily. *Lis des prairies.*

"Leaves remotely whorled, lanceolate, three-nerved. Peduncles long, terminal, mostly in threes. Corolla spreading. Raceme spreading."

This lily is about three to four feet high, and bears a loose cluster of yellow or red flowers at top, marked inside with dark spots. The petals are not rolled back, but merely bent out towards the points, by which character it may be readily distinguished from the preceding one.—It grows in the meadows about Quebec, and very generally throughout the country, on lands liable to be overflown. Although not such an elegant plant as the superb lily, it is highly ornamental in the flower border, and it improves by culture.

ERYTHRONIUM.—L.

Erythronium Americanum—Sm. Yellow dogstooth Violet.

" Leaves lanceolate, spotted. Petals oblong lanceolate, obtuse at the point.

A small bulbous plant, bearing a scape six or eight inches high, terminated by one handsome nodding flower; petals yellow, beautifully veined and rolled back. Leaves generally two or three from the root, smooth and marked with numerous dark spots, which afterwards disappear. Bulb small and deeply seated in the ground,

This beautiful little plant is found in great abundance about Quebec, in moist shady situations, shewing its handsome flower among the first in spring.

UVULARIA.—L.

Uvularia perfoliata—L. Perfoliate Bellwort.

" Leaves perfoliate, elliptic, obtuse. Corolla campanulate, granular, scabrous within. Anthers cuspidate."

A herbaceous perennial plant, about fifteen inches high: stem simple, forked at top; bearing a single pendulous flower from the end of one of the branches; petals pale yellow, narrow, not spreading out. Leaves closely veined and ending in a small point. Flowers in May. Grows on the side of the hill at Marchmont.

Uvularia grandiflora—Sm. Great Bellwort.

" Leaves perfoliate, oblong, acute. Petals smooth within. Anthers without awns."

This species resembles the preceding one, but the flowers are much larger and of a deeper yellow. Grows about Montreal.

Uvularia sessilifolia—L. Sessile-leaved Bellwort.

"Leaves sessile, oval-lanceolate, glaucous beneath. Petals flat, smooth within. Capsules stipitate."

A delicate perennial plant eight to ten inches high; stem simple, or forked at the summit, slender, with a few scattered leaves; flowers close bell-shaped, nodding, pale yellow. Common on dry ground about Quebec.

ASPHODELEÆ.—Juss.

PONTEDERIA.—L.

Pontederia cordata—L. Heart-leaved Pontederia. Pickerel Weed.

"Leaves oblong cordate. Flowers in crowded spikes."

A strong herbaceous perennial, growing in ponds and on the borders of lakes. Stalk about two feet high, bearing at the summit a close spike of blue flowers. Leaves few, four to five inches long, on a foot-stalk about one inch and a half in length. Grows abundantly round Lake St. Peter, and sparingly at the outlet of the River Etchemin.

ALLIUM.—L.

Allium Sibericum—L. Siberian Onion.

"Scape nearly naked, round. Leaves semicylindrical. Stamina subulate. Petals lanceolate, acute."

Leaves two, sheathing a third part up the stem, keeled. Outer leaf, four inches long above the sheath; inner one, one inch long, membranaceous. Flowers in a crowded head, light crimson; divisions of the petals broad lanceolate, and somewhat distorted at the extremity. Common on the rocky shores of the St. Lawrence near Quebec. This plant is not mentioned by writers on American botany.

Allium Canadense—L. Tree Onion.

"Scape naked, terete. Leaves linear. Head bulbiferous."

Native of the shores of Lake Ontario. This onion is esculent and cultivated.

Allium tricoccum—Ait.

"Scape naked, nearly terete. Leaves lanceolate-oblong, flat, smooth.—Umbel globose. Seeds solitary."

"Bulb large oblong. Leaves about four inches long, and an inch or more in breadth. Scape a foot high, striate. Umbel spreading. Corolla white. Capsule obtusely triangular. Cells one-seeded."—Torrey.

This plant on the authority of Pursh, grows about the River Ottawa; and, if I am rightly informed, is called by the country people, *Ail sauvage*. Esculent.

SMILACEÆ.—R. Brown.

CONVALLARIA.—L.

Convallaria bifolia—L. Least Solomon's Seal.

"Stem two-leaved. Leaves on short petioles, cordate oblong, very smooth on both sides. Raceme simple, terminal. Flowers tetrandrous."

A small upright plant, about six inches high, with two, and sometimes three heart-shaped leaves. Flowers small, white, deeply four-parted. Grows plentifully about Quebec, on dry ground.

Convallaria stellata—L. Star-flowered Solomon's Seal.

"Leaves numerous, alternate, oval-lanceolate, amplexicaule. Raceme simple, terminal."

A perennial plant about a foot high. Flowers small, white, deeply six-parted. Grows in moist ground; plentifully on the banks overlooking the falls of the Chaudière, and among the rocks below high-water mark, at Pointe Levi.

Convallaria trifolia—L. Three-leaved Solomon's Seal.

"Stem about three-leaved. Leaves alternate, oval-lanceolate, contracted at the base. Raceme simple, terminal, few-flowered."

A pretty little plant, four or five inches high. Raceme six to ten-flowered, followed by small red berries. Grows in moss swamps about Quebec.

Convallaria racemosa—L. Great Solomon's Seal.
Sceau de Solomon.

"Leaves numerous, alternate, sessile, oblong-oval, acuminate, nerved, pubescent. Flowers in a terminal racemose-panicle."

A perennial plant; stem two feet high, arched, smooth, angular. Raceme terminal, compound. Flowers small, six-parted, yellowish green. Berries red. Flowers in June. Found commonly about Quebec.

Convallaria pubescens—Willd.

"Stem nearly terete, furrowed. Leaves alternate, amplexicaul, ovate, pubescent beneath. Peduncles axillary, generally two-flowered."

A herbaceous perennial, one to two feet high; stem arched. Flowers cylindrical, yellowish green, pendulous by fine foot-stalks. Berries blue. Grows on the banks of the St. Lawrence, near Quebec.

DRACÆNA.—L.

Dracæna borealis—L. Wild Lily of the Valley.

"Subcaulescent. Leaves oval-obovate, margin ciliate. Scape pubescent. Umbel corymbed, sometimes proliferous. Pedicels naked, nodding."

A perennial plant, with three or four large radical leaves, six inches long, and two inches broad, ending in an abrupt sharp point. Stem a foot or more in height, angular, bearing four or six flowers towards the extremity, disposed by twos on upright foot-stalks, sometimes having the appearance of an umbel. Flowers yellow, large, divided nearly to the base. Berries a beautiful blue. This is a handsome plant, and grows in moist woods about Quebec.

There appears to be a strong disposition among late authors to remove this plant from the genus Dracæna.—Torrey has put it in Convallaria, and Pursh among his Smilacinæ.

STREPTOPUS.—Mx.

Streptopus roseus—Mx. Rose Bellwort.

"Smooth and shining. Leaves amplexicaul, serrulate-ciliate. Anthers short, two-horned."

A handsome perennial plant, about a foot and a half high, with a forked stem. Flowers axillary, single, pendulous on a short slender stalk, bell-shaped, rose-coloured. Grows on the banks of the St. Lawrence near Quebec. It deserves a place in the flower border.

Streptopus distortus—Mx. Heart-leaved Bellwort.

"Smooth. Leaves amplexicaule, smooth on the margin. Pedicels distorted, and geniculated in the middle."

A perennial plant, resembling the preceding. Stem two feet high, with several forked branches. Leaves two to four inches long, ovate-lanceolate, many-nerved, acuminate. Flowers solitary, on slender foot-stalks an inch and a half long. Flowers greenish yellow. Grows about the river Ottawa. I have not observed it yet in this neighbourhood.

SMILAX.—L.

Smilax peduncularis—Willd. Jacob's Ladder.

"Stem terete, climbing, or arched. Leaves round-ovate, cordate, acuminate, about nine-nerved. Umbels long peduncled."

A herbaceous perennial. Stem three to five feet high, branched. Leaves ending abruptly in a sharp stiff point, irregularly placed, on short foot-stalks, with tendrils at the axils. Flowers in a globular radiated head, about two inches diameter, on a stalk six inches long, issuing from the joints of the stem. Fruit, small black berries in a crowded cluster. This plant has a very unpleasant scent when bruised. It grows in moist meadows about Quebec, and throughout Canada.

GYROMIA.—NUTTALL.

Gyromia virginica—NUTT. Medeola virginica—L.
Indian Cucumber.

Herbaceous. Stem simple, smooth, furrowed, woolly at the joints, about eighteen inches high. Leaves in two whorls, one at the summit, of three or four leaves, the other lower down, of six or seven leaves, sessile; the upper ones lance-ovate, the others lance-oval, thin, smooth, entire, paler beneath. Flowers, three or four at the summit, yellow, on short foot-stalks, pendulous between the leaves. Berries dark blue. Grows in moist woods, near the falls of the Chaudière, and frequently throughout the province. The root is succulent, has the flavour of cucumbers, and is said to be eaten by the Indians.

TRILLIUM.—L.

Trillium pictum—PURSH. Painted Herb truelove.

"Peduncle somewhat erect. Petals oval-lanceolate, acute, recurved, nearly as long as the narrow calyx. Leaves ovate, acuminate, rounded at the base, abruptly contracted into a short petiole."

A pretty herbaceous perennial. Stem simple, about eight inches high, with three leaves at the summit.—Flower on a short stalk from the centre of the three leaves. Petals narrow, white, with a transverse crimson bar near the base. Berry, bright red. Grows plentifully about Quebec in dry woods.

Trillium erectum—L. Purple Herb truelove.

"Peduncle inclined. Flower nodding. Petals ovate acuminate, flat, spreading, broader and a little longer than the calyx. Leaves broad-rhomboid, acuminate. sessile."

A herbaceous perennial plant, a foot high, stem simple. Flowers large and showy, generally of a brown purple

colour, but sometimes red, pink, yellow, and even white. Berries purple. This is an ornamental plant, frequently found in gardens: but it will not bear handling on account of a disagreeable dog-like scent. Grows very commonly in this neighbourhood, especially on the steep banks of the St. Lawrence.

Trillium grandiflorum—Salisb. Large-flowered Trillium.

"Peduncle inclined. Flower somewhat erect. Petals spathulate-lanceolate, connivent at the base, much longer than the calyx. Leaves broadly rhomboid-ovate."

A beautiful perennial herbaceous plant, having much the habit of the preceding one. Petals large, white, changing gradually to red. Berries dark purple. Grows on Montreal Mountain. I have not observed it in this neighbourhood. This showy plant ought to be more generally introduced into flower gardens. The whole of this genus is now in great request in Britain.

IRIDEÆ.—Ventenat.

IRIS.—L.

Iris versicolor—L. Various-coloured Iris. Common Flag.

"Flowers beardless. Stem terete, more or less flexuose. Germen somewhat triangular. Leaves ensiform."

A herbaceous perennial plant, about two feet high.—Flowers three or four at the summit. Petals purple and blue, inner ones paler. Leaves about three quarters of an inch wide, and generally equaling the stem in height. This is the common Iris of our brooks and swamps.

Iris tridentata—WALT. Three-toothed Iris.

"Beardless. Stem terete, longer than the leaves. Leaves ensiforme. Rudiments of the interior petals three-toothed, the centre tooth acuminate. Capsule three-sided."

Stem about two feet high, bent at top. Leaves sheathing, double, smooth and shining within, two-edged towards the point. Petals three, blue, marked with purple veins. Grows on the Island of Anticosti.

Iris Siberica—L. Siberian Iris.

"Beardless. Stem hollow, terete, passing the leaves. Leaves linear. Capsule short, three-sided, both ends obtuse."

Flowers blue, about three on the stem. Grows near the River Ottawa, on the authority of Pursh. I have not seen it.

Iris cuculata—PURSH, MS.

Pursh, in his visit to Anticosti in 1818, discovered a new species of Iris, which he thus named in a manuscript note. I have no specimen nor description of it.

SISYRINCHIUM.—L.

Sisyrinchium anceps—CAVAN. Blue-eyed Grass.

"Scape two-edged, winged, simple, nearly leafless. Spath about four-flowered, unequal, shorter than the flowers. Petals mucronate."

Plant perennial. Stem simple, about a foot high.—Leaves few, linear, half the length of the stem. Flowers deep blue, small, handsome. Common in meadows everywhere.

Sisyrinchium mucronatum—Mx.

"Scape simple, winged. Spath coloured, one of the valves extending into a long marcescent point."

Stem cespitose, about a foot high. Spath consisting of two very unequal valves, one of them about as long as the

peduncles, the other continued half an inch or more beyond the flowers, and ending in a rigid point; both of them strongly coloured, generally violet, by which character it is easily distinguished from the preceding species. Grows on the shores of Lake Huron, according to Pursh.

CORYLIDEÆ—S. F. Gray.

CARPINUS.—L.

Carpinus Americana—W. Hornbeam. Blue Beech. *Charme.*

"Leaves oblong-ovate, acuminate, unequally sawed. Scales of the ament three-parted, the middle division with a lateral tooth."

A small tree, about the size of an apple-tree; having a smooth bark like that of the beech. The wood is extremely hard and close grained, resembling boxwood in texture. Raftsmen make withes of the sappling trees to bind their timber together into rafts. It grows on the Island of Montreal and in other parts of the province; but as far as I know has not been found near Quebec.

OSTRYA.—Mx.

Ostrya Virginica—W. Hophornbeam. Ironwood. Leverwood. *Bois dur.*

"Leaves ovate-oblong, subcordate, acuminate, unequally serrate. Strobiles, oblong ovate, erect."

This tree is of larger and more upright growth than the hornbeam. It has a rough scaly bark, and the stem frequently assumes a knotty irregular appearance. The wood is heavy and tough in the extreme; these properties render it very suitable for levers, axletrees and other purposes requiring great strength. The centre of the wood is extre-

mely bitter, and has been found a powerful remedy for intermittent fevers, in form of decoction.

The fruit resembles hops, whence its English name.—This tree is very common about Quebec on stony land.

CORYLUS.—L.

Corylus Americana—W. Hazle. *Coudrier. Noisettier.*

" Leaves broad, heart-shaped, acuminate, doubly-sawed. Ribs strongly prominent beneath, woolly where they join the midrib. Calyx of the fruit hispid, with glandular heads at the ends of the hairs, longer than the roundish nut, limb spreading, tooth-serrate."

A shrub six to eight feet high, producing a well flavoured nut. It grows very abundantly in the upper parts of the province. I have not observed it near Quebec.

Corylus rostrata—W. Beaked Hazlenut tree. *Coudrier.*

" Leaves oblong-ovate, acuminate. Stipules lance-linear. Calyx of the fruit bell-form, two-parted. Divisions gash-toothed, lengthened out beyond the nut into a beak."

A smaller shrub than the preceding one; also producing a pleasant fruit. The foliage resembles that of the common elm. This plant may be readily distinguished from the other by the long beaked calyx covering the nut; whereas the fruit of the americana is exposed to view when ripe. Grows very commonly about Quebec in dry woods.

QUERCUS.—L.

Quercus coccinea—Wm. Scarlet Oak.

" Leaves long-petioled, oblong, deeply sinuate, glabrous. Lobes divaricate, toothed acute, setaceous-mucronate. Calyx turbinate, marked with scales. Acorn short-ovate."

This oak I have not seen—it is a Canadian tree on the authority of Pursh, who says, in a MS. note, it grows on the Ottawa.

Quercus ambigua—Mx. Grey Oak.

"Leaves sinuate acute. Bays acutish. Cups somewhat saucer-shaped. Acorn turgid, egg-shaped."

The grey oak of Michaud grows about Quebec in company with the red oak, which it closely resembles; so much so that some writers will not allow them to be specifically distinct. The timber is not in request.

Quercus rubra—W. Red Oak. *Chêne rouge.*

"Leaves long petioled, oblong, glabrous, obtusely-sinuate. Lobes acutish, toothed, ending by a bristle. Calyx saucer-form, smoothish. Acorn subovate, turgid."

The red oak is a very ornamental tree for parks and kept grounds, growing to a large size on good land. Little, however, can be said in favour of the timber; being but of indifferent quality; it is only used for staves for sugar hogsheads, and other dry casks; large quantities of which are annually exported to the West Indies, and rate at about two thirds the price of white oak staves of the same size.

Quercus macrocarpa—Mx. Overcup Oak.

"Leaves downy beneath, deeply lyrate-sinuate-lobed. Lobes obtuse, repand, upper ones dilated. Calyx bowl-form. Upper scales setose. Acorn turgid, ovate, large."

A large tree producing timber of excellent quality.—Pursh had a Canadian specimen of this tree; but it does not appear where he found it,—very probably in the upper province.

Quercus lyrata—W. White water Oak.

"Leaves with very short petioles, smooth, lyrate-sinuate, widened at the top. Lobes oblong, acute, upper ones truncate-angled. Cup depressed globular, the scales ending in short firm points. Acorn globular, almost covered by the cup."

This oak grows on the borders of the St. Lawrence in

the upper parts of the province; but it does not attain a large size.—The timber is said to be of good quality.

Quercus alba—W. White Oak. *Chêne blanc.*

"Leaves oblong, sinuate-pinnatifid, pubescent beneath. Lobes sublinear, obtuse, entire, narrowed at their bases. Fruit peduncled. Calyx somewhat bowl-formed, tubercled, flattened at the base. Acorn ovate."

White oak grows in the southern and western parts of this province, and abundantly in Upper Canada. In rich alluvial soils it attains very large dimensions, sometimes measuring five feet in diameter at the base. Great quantities of squared timber and of staves made of this species of oak, are annually floated down the St. Lawrence, and shipped to Britain, Ireland, and the West Indias. The timber is also extensively used here in ship-building.

Quercus bicolor?—W. Swamp white Oak.

"Leaves long petiole, oblong-ovate, white downy beneath, coarsely-toothed, entire at the base. Teeth unequal, spreading, acutish, callous at the point. Fruit in pairs, long peduncled, the peduncle terminating in a bristle. Calyx hemispheric. Acorn oblong-ovate."

A large tree growing sparingly in this province. Leaves resembling those of the beech. Acorn sweet. Native of the island of Montreal.

FAGUS.—L.

Fagus sylvatica—W. White Beech. *Hêtre blanc.*

"Leaves ovate, acuminate, slightly toothed, ciliate, acute at the base. Nut ovate, three-sided, obtuse, mucronate."

A beautiful tree, with a smooth gray bark, growing usually on stony land, and in favorable situations, attaining a large size. The timber is not much used in this country, except by plane-makers. It is excellent fuel, being only inferior to sugar-maple and black birch in that respect.—

This is an European tree, and said to be the only one indigenous to Canada. It is found abundantly about Quebec.

Fagus ferruginea—W. Red beech. *Hêtre rouge*

"Leaves ovate-oblong, acuminate, pubescent beneath, coarsely toothed, at the base obtuse-subcordate-oblique. Nuts ovate, three-sided, very acute."

This tree very much resembles the preceding one, and is equally ornamental. The timber is of a reddish colour, whence its name, and is said to be of a superior quality; more closely resembling English beech in this respect than the other; it is therefore entitled to a preference for those purposes in which this timber is used, such as shoe-lasts, plane stocks, and turnery wares. Grows in similar situations with the former species.

CELTIS.—L.

Celtis occidentalis—L. Nettle tree. *Bois inconnu.*

"Leaves ovate, acuminate, generally serrated, except near the base; scabrous above, rough-haired beneath. Fruit solitary."

A large tree, growing usually in alluvial soils. The timber is hard, rives freely, and resembles ash in texture; it is sometimes used by chair-makers and wheelwrights.—In Lower Canada rather scarce, but grows in company with elm, ash, and red maple, on the low shores of the Ottawa, and on the islands in Lake St. Peter.

PLATANUS.—L.

Platanus occidentalis—L. American Plane-tree. Buttonwood. *Cotonier.*

"Leaves five-angled, obtusely lobed, toothed. Stem and branches becoming white."

The plane, said to be the largest tree in the North

American forests, does not appear to be a native of this province; yet borders very closely upon it, as I have observed it growing naturally near Burlington, on Lake Champlain, about half a degree south of our boundary line. It is very common in Upper Canada.

This tree is ornamental, and is successfully cultivated at Montreal. I doubt not it would succeed here in the alluvial soils, which it naturally prefers.

MYRICÆ.—Richard.

MYRICA.—L.

Myrica Gale—L. Sweet Gale. Dutch Myrtle. *Galé. Piment Royale.*

"Leaves wedge-lanceolate, obtuse, sawed at the end. Staminate ament imbricate. Scales acuminate, ciliate. Fruit in a dry head.

A bushy shrub about three feet high, of handsome appearance. The foliage is dark green above, and very fragrant. This shrub, according to Miller, has numerous good and useful qualities; for a description of which, that author may be consulted. From the number, it may not be improper to quote from him that—"The cones boiled in water, throw up a scum resembling beeswax, and gathered in sufficient quantities, would make candles. It is used to tan calf-skins. Gathered in the autumn, it dies wool yellow, and is used for that purpose both in Sweden and Wales."

The Myrica Gale appears to have long been held in esteem for its various good qualities, that of producing wax might be tried here with little trouble, as the plant is very abundant with us. This pretty shrub grows on the margins of lakes and rivers, and is found near Quebec, at Cap Rouge and on the low shores of the St. Charles.

Myrica caroliniensis—W. Bayberry bush. Candleberry Myrtle. *Myrte à Chandelle. Galé cirier.*

"Leaves wedge-oblong, coarsely toothed. Staminate aments lax. Scales acute. Berries globular, large."

A shrub, three or four feet high, bearing berries covered with a substance resembling wax or tallow, as is also the fruit of two other American species, the cerifera and the pennsylvanica, from which candles have been made: on this subject an article in the first volume of the Society's Transactions, compiled by a member, may be consulted. This species grows along the seaboard from the Gulph of St. Lawrance to Florida, keeping within the influence of the sea atmosphere. I am informed by one of our Vice-Presidents,* that it is found in the Gulph of St. Lawrence, as high up as Hare Island.

[End of the first part.]

On LENGTH *and* SPACE, *by the Rev.* D. WILKIE.

LENGTH of time, is the continuance of any sensation, and is perceived by all the senses. It is measurable only in one way, that is, TIME has only one dimension.

Length, properly so called, that is, EXTENSION, is first perceived and accurately measured by the sense of Touch only. It is roughly judged of by the eye, and perceived by

* Andrew Stuart, Esqr.

no other sense whatever. It is measurable in three ways; that is, has three dimensions,—length, breadth, and thickness. Bodies can be measured in these three respects.

1.—If one body is laid upon my finger, and I feel the impression from the tip of the finger to the middle, and if another is laid upon it, so that I feel the impression from the one end of the finger to the other; there is, then, a manifest difference between the two impressions. I know not in what this difference consists; but, to make known to my companions that I perceive a difference, I call the object from which I receive the former impression SHORT, or SHORTER, and that from which I receive the latter impression LONG, or LONGER. By applying the same objects to different parts of the body, corresponding impressions will be received. Thus, it will appear, that objects which are *short* in one case, are so in every case; and that those which are *long* in one case, are long always. A belief is thus induced, that nature is uniform in her operations; and we never doubt, that objects that seemed longer at one time, will be found so at another. By directing the eye to the two objects, different impressions are received through this sense; and after a multitude of trials, we learn to distinguish long from short objects by their different appearances. In some bodies, namely, sonorous ones, long from short ones, may be distinguished by the ear, in consequence of the different sounds which they emit when struck. This information is generally very indefinite, but it admits of considerable improvement by practice and study.

Thus, it appears that our ideas of length, imply merely the perception of a difference between the impressions made upon them by long and short objects. All we know of the

subject is, that long and short objects make different impressions upon the senses both of touch and sight. We feel that difference, but know nothing of the cause of it, nor is it at all necessary that we should. We invent the terms long and short, to make known to others the difference that we feel. We agree with them respecting the words thus proper to be employed for our mutual advantage.

2.—It does not appear that the senses of tasting and smelling, furnish us with any ideas of length; that is to say, they do not distinguish between long bodies from short ones. For, though a difference may be perceived between a long and a short substance, when placed within the mouth or within the nose, this difference is discovered solely by the sense of touch diffused over these parts, as over the rest of the body, and not in the least by the different tastes or smells afforded by these substances.—Nor does our perception of the presence of electric substances give us any information on this subject.

Thus, it appears that our knowledge of the properties of long and short objects, is first received, and principally acquired by touch, greatly promoted by the eye, and in some cases, slightly assisted by the ear; and that by no other senses whatever, is any information received on this subject.

3.—From comparing together more than two objects, we acquire the ideas of *long*, *longer*, *longest*, and *short*, *shorter*, *shortest;* and the purpose of social converse requires, in all languages, the invention of terms corresponding to those ideas. The meaning of these terms, is settled by convention, and cannot be conveyed by logical definition. On meeting a stranger to these words, we must show him examples of the objects, before we can

communicate to him our impression, or, in other words, make him understand what we mean by the terms thus employed. The word EQUAL is explained in the same manner.

4.—As a long substance exceeds a short in some respects, or is greater than it, the frequent application of these terms, would at least require the use of another. It would be natural to ask, in what way does it exceed?—and in what respect is it greater? To answer this question, as well as to suit other purposes in discourse, the invention of the abstract term LENGTH would be found convenient.—In what does your rod exceed mine? In length.

The introduction of this general and abstract term, must have been long posterior to the use of the words long and short: A further refinement in language required the use of the corresponding abstract term—SHORTNESS. But this being resorted to on much fewer occasions, and for much less important purposes, would be introduced much later in the progress of language. For the word length is applied to all objects whether comparatively long or short: but shortness is only applied when deficiency in length is intended. The further wants of society, introduced into their discourse, the verbs—TO LENGTHEN and TO SHORTEN.

5.—To ascertain whether one object was longer or shorter than another, the method that would most obviously present itself to those who had distinct ideas of length, or of long and short, would be to apply the one object to the other. It would then be preceived either by touching them or looking at them, whether they were equal, and if not, which was longer, and how much it was longer. If the idea of the number two had been previously familiarised to the mind, then by applying the short one twice to the

longer, it would be perceived whether the one was equal to two of the other. If the mind had been familiarised to higher numbers it could, in like manner, be ascertained, whether the one contained three or four times the other, or contained it any number of times whatever. Thus, the idea of a MEASURE would be acquired, and its name required in conversation.

6.—The utility of a measure would be still more apparent, when the mind came to compare two immoveable objects, which could not be brought together, for the purpose of determining which was longer or shorter. The application to them both successively, of the measure, the one being longer than itself, though it appears to us a simple expedient, was undoubtedly the fruit of much reasoning in the infancy of human intellect, and must have been hailed as a beautiful and useful invention. It appears, however, to be known in the rudest states of society ; and may be considered as the common property of the species. It does not appear that the inferior animals ever attempt to measure, or determine the comparative length or size of objects in any other way, than by looking at them, and touching them, though they must have acquired these impressions first by touch, as well as ourselves; yet, it is demonstrable that they judge much more frequently by the eye than by the other sense. We invariably consider it as a mark of extraordinary sagacity in an animal, when we see it turn over an object with its foot for the purpose of perceiving its size and form.

7.—When two things are severally equal to the measure employed we see intuitively, that they are equal to another. By contemplating a number of conclusions of this sort, we come to this general conclusion that, " things which are

"equal to the same thing, are equal to each other." This general truth, we call an AXIOM or FIRST TRUTH; because it is certain, and cannot be called in question. Yet its evidence arises entirely from the view of particular instances taken in detail; and not from any quality in the general proposition. This axiom is as applicable to numbers as to length, and its evidence there also arises from a view of particular instances. By the application of numbers to measures of length, we obtain another set of axioms. Thus, things which are severaly double of one thing, are equal. Things which are severally treble of one thing, are equal. Things which are halves of the same thing, are equal. These axioms are obviously innumerable, all undeniable, and of great utility.

8.—Material objects may be considered as longer and shorter, not only in regard to the distance of the one end from the other, but also in regard to the distance of one side from the other. For the sake of distinction, the former distance is called the LENGTH, properly so called, of the object, and the latter is termed its BREADTH. The two ideas are obtained in perfectly the same way from touch, improved in the same way by the sight, and perfected in the same way by an accurate measure—they admit of the same axioms. In fact, they differ in nothing except this single circumstance, that the one is the distance of the ends, the other of the sides. Whenever the length and breadth are unequal, the less is considered as the breadth, and the greater as the length. Mathematicians correct the loose ideas of mankind on this subject. But their definition of breadth pre-supposes that of a perpendicular, and previous even to that, the knowledge of the properties of a straight line, which cannot be defined.

9.—But further, material objects are found to be longer or shorter not only in their distance from end to end, and from side to side, but also from top to bottom, or from the upper surface to the lower. This introduces the idea of height, depth, or THICKNESS. Our ideas of this quality are obtained precisely in the same way as those of length and breadth, are improved in the same manner, and explained to others in the same way. The property itself is measured in the same way, and admits of a similar mathematical definition with breadth.

10.—Such are the three dimensions, or measurable properties of bodies, and they are not known to possess any others. Of these three, the primary is *length*. This is the first which the infant, or rude mind contemplates; and it is that which occurs most frequently in human life. Whatever measure, therefore is adopted for it, is used also for the other two. An accurate measure of it pre-supposes the knowledge of the properties of a line, and of a straight line, the exact meaning of both which terms, must be communicated by example and explanation, as no logical definition of them can be obtained. The measure of length is the foundation of all other measures whatever, of time, motion, weight, price, power, heat, electricity, moisture, &c. No accurate measure is known to exist which has not this for its foundation. Yet measures of length are adopted by the individual only by arbitrary assumption, and used by different individuals by convention or by imitation.

11.—Some objects have a sensible breadth in every part of them; others are so thin and narrow, that, to the untutored mind, they appear to have no breadth at all, and to possess only length. The former impression, when we would speak of it, comes to be denoted by the various

terms, SPACE, ROOM, EXTENT, SURFACE, SUPERFICIES. The meaning of these terms is usually explained to children, by showing that the room in which they are, contains more space than the table, the table more than the paper on which they write, the paper more than one's hand, and the hand more than the blade of a knife. It is no solid objection to this account, that the ideas thus furnished are inaccurate, and that we afterwards discover, by mathematical contemplation, that there are no material objects without breadth. This correction of our ideas is long posterior to the origin of them, and pre-supposes much experience in thinking and reasoning. We learn, then, after all this aid to think of those creatures of imagination called LINES, that is length without breadth or thickness, and inquire into their properties. We thus also acquire correct ideas of surface, and learn the art of measuring it. Neither let it be objected that, if nature did not give us the idea of a mathematical line, no effort of imagination could. This may probably be true. Children, and very ignorant persons, have nearly the same, probably the very same conception of a hair, a thread, a fibre, and other long thin substances, that a mathematician has of a line. Experience and reflection afterwards discover, that no body can be felt which has not sensible breadth and thickness; and the mathematician transfers to the creatures of his imagination, the properties which he had formerly, but erroneously, attributed to certain material objects. That is, he thinks certain things, namely lines, to be long and not broad; which is exactly the distinction made by inexperienced persons, between substances that have surface or breadth, and those that are thought to have none. The distinction between surfaces and solids, is rudely introduced, and

afterwards corrected, in precisely the same manner.

12.—It is evident that the idea of length, upon which all these which we are here concerned with depend, cannot be acquired without the assistance of memory. Without this power, the length of no objects can be compared, which do not present themselves to the senses at the same instant of time. Even when two objects are felt by the hand, or seen by the eye, at the same time, it is doubtful whether the mind attends to them both at once. It is more probable, that they are felt and seen successively; and that the mind attends first to the one and then to the other. Consequently the exercise of memory must be necessary even for the comparison of objects immediately perceived.

13.—When the mind has been well accustomed to the view of lines, and has actually felt and seen many of them; it will readily perceive that they are of different kinds. In viewing many different lines, or many different objects that possess length, memory will soon suggest to us, that these lines are not all of the same nature. Thus a rainbow, a coiled rope, and an arrow present appearances extremely different from one another. The impressions which the two latter produce upon the sense of touch are as different as those produced by them upon the sight. A number of trials, while memory compares the present with the past, convinces us, that the impression made by the coil of ropes upon the touch is uniform: and that that upon the sight is also uniform. The impressions made by the arrow upon the same sense are equally uniform. The effects arising from perceiving these two objects by either sense, are perfectly distinct; and, though we can never tell in which that difference consists, the difference is so striking, that so long as memory remains, we are never in any danger

of confounding those two objects. But it is not enough to perceive this difference. We wish to communicate our perceptions to others with whom we have already conversed on other subjects. We wish to tell some other persons which object it is we perceive, or which description of objects. For this purpose we apply the word STRAIGHT to the one, and the word ROUND to the other. When still greater precision of language was required, all lines which are not straight were called CURVES, and the word *round* appropriated to circular bodies, or circular lines.

Mathematicians have been at vast pains to discover an appropriate and logical definition of the word straight, but hitherto with very little success. Whether a logical definition of it may be obtained, I shall enquire afterwards. What I mean to state at present is, that mankind in general, learn the meaning of this term solely from exemplification. We teach children the distinction, by placing a straight and a curve object before them, and telling them that the one is named the one way, and the other the other way. It is certain that they all learn the distinction very quickly in this way, and understand very clearly what is meant by these two words. But if they were left to be taught the distinction by logical definition, millions must certainly remain for ever ignorant of it; and it is extremely doubtful, whether any could, ever by this means, become acquainted with it.

14.—The science of geometry is founded on our knowledge of lines. Before men can study geometry, they must be agreed about the meaning of certain terms which lie at the foundation of that science, but which do not admit of any logical definition. The following appear to be the principal terms used in geometry, which fall under this

description: . Length, breadth, thickness; a body, a surface, a line; a point; a straight line, a curve, an angle. The meaning of these terms must be settled by description, and by exhibiting examples to the eye. When this is done, all the other terms used in geometry may be logically defined, so that their precise application can never be mistaken, nor admit of any ambiguity. But, besides determining by convention and example, the meaning of the abovementioned terms, it is further necessary, before proceeding to teach the science of geometry, to assume some property of a straight line. For this purpose, different properties of the straight line, have been assumed by different geometers. One of the properties most commonly assumed for this purpose is, that "if two straight lines coincide in two points, they will coincide throughout." This property, though not assumed by Euclid, is implied in the fourth proposition of the first book; for, if it be not presupposed, the bases of the two triangles, though coinciding in the two angular points, may not coincide in other points, and consequently may not be equal. Another property sometimes employed for this purpose is, that a straight line is the shortest distance between two points. But each of these is a theorem, and not a definition. They are indeed both theorems which cannot be demonstrated or proved, and therefore I have said, they must be assumed. What I have said of the impossibility of defining the terms straight line and angle, refers only to the present state of the science, and does not preclude the possibility of discovering definitions of one or both of them. A logical definition of an angle, would add a new beauty, and a new degree of simplicity to the subject; but a correctly logical definition of a straight line would greatly elucidate the elements of

the science, and remove the principal obstacles that lie in the way of the young student's advancement. Besides these assumptions, a new one has been usually found necessary to the illustration of parallel lines. Legendre is said to have removed the necessity of this assumption in two ways. —Leslie professes to have removed the difficulty, in prop. 23d, book I. of his Elements of Geometry, but has not entirely succeeded. If logical definitions could be found for a straight line and angle, which would lead to direct proofs of the different properties of these two objects, as well as of parallel lines; it appears to me, that the theory of geometry would be complete.— Our notions of length, breadth, thickness; of a body, a surface, a line; are derived from the senses, and cannot, in all probability, be derived from any other source.

Number is derived from all the senses, and is a property of all objects whatever, even of such as are incorporeal. Arithmetic is therefore the simplest of all sciences. The only terms which it requires to be understood without definition are, one, sum, difference. When the import of these terms is settled by convention, and by reference to the senses, all the others required, may be defined; and thus, the science is erected by the contemplations of the mind itself.

In this imperfect Essay, I have endeavoured to investigate,

1.—How ideas of length and shortness are introduced, and what we understand of these qualities, and the rise of the words denoting them.

2.—By what senses they are conveyed to us.

3.—How our language on this subject to further improvement.

4.—The introduction of the abstract terms, length, lengthen, and their opposites.
5.—The application of a measure to one object.
6.—The application of it to two immoveable objects at a distance.
7.—The reasonings founded on this invention.
8.—The idea of breadth.
9.—That of depth or thickness.
10.—Extensive application and use of measures of length.
11.—Introduction of the abstract terms, space, solidity, &c.
12.—The mental faculties concerned in acquiring these ideas.
13.—The different kinds of lines, straight and curve.
14.—The principles assumed in geometry.

Additional NOTES *on the* GEOGNOSY *of* SAINT PAUL'S BAY, *by Lieut.* BADDELEY, *R.E.*

THERE is no spot in Canada more likely to become the resort of the invalid and of the admirer of beautiful scenery than St. Paul's Bay and its captivating valley; nor is there any river in Canada more likely to have a flourishing manufacture established upon its shores than the Gouffre, which, intersecting the above mentioned valley on a course from the westward of north, enters the St. Lawrence at St. Paul's Bay.

The iron mines, mineral springs, and earthquakes which characterize this section of Lower Canada, are objects, the pursuit of which will not fail to gratify the scientific taste of the tourist, while his admiration of the picturesque will be unceasingly excited, as he wanders through the neighbourhood. It is scarcely possible to conceive a more beautiful drive than is afforded by both

banks of the Gouffre, over an excellent road for four or five leagues into the interior. In England this valley would be as celebrated as that of the Dove or Clywd: to the latter it bears a striking resemblance. Hitherto visitors have contented themselves in general with a view of the bay merely, and to this is partly owing the little information we possess respecting the interior; had it been otherwise, this place would not have experienced the neglect it has, but would, at least as a watering place, have rivalled Kamouraska, on the opposite shore, which can bear no comparison with it in point of scenery.

To those who may have a week's or a fortnight's leisure during the summer we strongly recommend the tour of this valley, the only drawback to which is the uncertainty of reaching or leaving St. Paul's Bay on account of contrary winds, and the probability which exists in consequence, of being confined to a boat or schooner for an unwelcome period; of the misery of which, as it has been twice our lot to incur it, we speak feelingly. If sufficient encouragement were given, a steam-boat would run between Quebec and St. Paul's Bay at stated periods, and then the difficulty would vanish; at all events, to those who possess a stout pair of legs and the desire to use them, the task of reaching the spot is an easy one.—For horses and carriages the road either is or was impassable. As to houses of entertainment at St. Paul's Bay, in the popular sense of the word, we know of none. There are, however, as elsewhere, many respectable Canadians who would not object to receive *en pension*. For ourselves, while there, we had the good luck, (which few must hope for, as it would be a breach of politeness to intrude,) to experience the hospitality of Mr. Chaperon and his family, and the

extreme attention and kindness of every member of it, made us all feel how much more there is in the manner of conferring a favor than even in the favor itself.

The mineral springs of St. Paul's Bay, &c. which will be among the first objects to attract the notice of the stranger, are of three kinds, saline, sulphuretted, and chalybeate. —The first the least abundant, the last the most so. The saline and sulphuretted springs are confined to the alluvial land of the valley of the Gouffre and principally, if not entirely, to the almost immediate neighbourhood of St. Paul's Bay.* This land consists of a very plastic marly clay, overlying carboniferous limestone, and underlying loamy, sandy, and vegetable deposits. Sandy ridges are also very characteristic of the valley. This valley, perhaps, half a league wide in its widest part, is enclosed on all sides, except towards the Bay, by a chain of mountains consisting of primary rocks. These rocks, towards the lower end of the valley, have large deposits of carboniferous limestone at their feet, while those at the upper end are characterised by being the matrices of large quantities of magnetic iron. Such is a short geological sketch of this valley, intended as explanatory of the geological position of these mineral springs to which we again return. The sulphuretted waters, which are found in many places in the lower part of the bay, are remarkable for a white slimy scum, or curd, which covers them. Pieces of wood, and the stones lying in the stream have often a coating of the same substance. When dried, these pieces, over the flame of a candle, burn with a weak, blue, and almost lambent flame, giving out the odour of sulphur. This coating has

* In the Eboulemens sulphuretted waters are said to be more abundant.

a tufaceous aspect, and is evidently not sulphur, neither is it a carbonate, as it does not effervesce in acid. It is more probable that it is a sulphate of lime containing a small portion of sulphur in a free state—the chemist, however, must decide this. The first intimation the stranger receives of being in the immediate vicinity of these springs is the strong disagreeable smell of sulphuretted hydrogen, which he liberally inhales, and if not satisfied with the proof which his nose affords, he requires the further evidence of his palate, the unwelcome flavour of spoilt eggs will convince him of the presence of sulphur under its most offensive form.

The iron, or chalybeate waters are very abundant, and are often found associated with the sulphuretted springs as if they had had one common origin, which indeed is very possible, as the decomposition of beds of iron pyrites would afford them both. Whatever may be the origin of the sulphuretted waters, however, we think that those containing iron are generally attributed to a partial solution of the magnetic oxide of iron of the neighbourhood; what the solvent may be, (if any other solvent than water be required,) we can only conjecture. Decaying vegetation affords the phosphoric acid, and it is well worthy of remark that bog ore, which is evidently a precipitation from waters holding iron in solution, *always* contains the phosphate of iron.

The astringent ink-like flavor of these waters is a sufficient distinction to the taste, and when stagnant, or nearly so, a scum or a deposit of a red colour, which is in fact the rust of iron, marks their course. An irised pellicle floating on the surface of such waters is also an indication of the presence of iron.

Salt springs, as has been said, are not abundant, nor have any been observed, as we think, at such heights as to preclude the *possibility* of their having their origin in the St. Lawrence. It must not be omitted to mention, however, that there is a close association in nature between sulphuretted and saline waters.

The salt and sulphurised waters appear to spring from the plastic clay before mentioned, while the chalybeates usually traverse the surface of the ground.

Of the mineral springs we shall soon have an analysis by an able hand, which, if it shall not give us the exact proportion, in which their several constituents enter, (a manipulation requiring considerable labour and skill) will at least make us acquainted with those constituents.

While at Mr. Chaperon's, we visited two sets of sulphuretted waters occurring on opposite sides of the bay, in low swampy ground, and near, or at the foot of the carboniferous limestone before mentioned.

On the western side of the bay, one of these springs was observed to enter into water of a remarkable blackness, and this water was observed in one or two other places.—Upon digging in several places a black gritty substance was thrown up, which bore a strong resemblance to a mixture of sand and lignite, and the occurrence of much rotten wood, appeared to account for the presence of the latter. However, upon exposing it to heat it neither formed a cinder nor gave out any inflammable gas, but appears to be composed almost entirely of common sand. In a wet state the sand possessed almost the inky blackness of the water. We feel much inclined to think that the spring here, containing sulphuretted hydrogen, meets with other waters containing lead antimony, or some other metallic

oxide in solution, and produces the phenomenon described. But this is a chemical question which we approach with extreme diffidence. Mr. Gagnon, the priest, informed us that he had detected antimony in the waters hereabouts, and to that circumstance he attributed the poor condition of the sheep in this neighbourhood.

The limestone on the eastern side of the bay, dips to the westward, while that to the westward dips eastward. This limestone is of a dark shade of colour, fetid odor, compact structure, and is destitute of organic remains, at least we saw none. The last character, together with its high dip (about 45°) and contact with rocks esteemed to be of the primary order, induces us to consider it as belonging to that portion of the carboniferous order of Phillips, called transition limestone by some authors. The position of this limestone dipping away, at a high angle, from the base of the primary rocks on both sides of the valley, induces the belief that the latter have been elevated since the deposition of the former.*

Kalm has mentioned the occurrence of an argentiferous galena in some of the rocks of St. Paul's Bay. We have seen several specimens, and have tested successfully the presence of silver, which indeed is common enough in lead ores, every where.

We searched in vain for the actual position of the rock

* Analogous appearances indicating the same event are not wanting in other places in Canada. Capt. Bayfield, R. N. has given instances at page 18, pl. 4 and 5, vol. I. of these Transactions; and the left bank of the St. Maurice near the falls of the Greys, offers another, where the old red sandstone below the falls, dips down the river, while above the falls it dips in a contrary direction. A thick stratum of grey wacke lies above the sandstone, and granite or gneiss below, the whole surmounted by a fetid and fossiliged limestone, of the carboniferous order, covered by a deep alluvium, first of clay and then of sand, the latter uppermost.

in which it is found. But in a field at the foot of some felspathose rocks on the eastern side of the bay, a large block or two were found of a white laminar carbonate of lime much mixed up with a beautiful light green fluate of lime, (colorophane?) having disseminated through the mass threads and seams of galena, the laminæ of which are small and brilliant. These blocks were angular, and could not have travelled far. We ascended the hill in search of the vein or bed, but found nothing but bare and whitened surfaces of primary rocks projecting from the ground. A more particular examination, however, would probably be attended with success, for the matrix of the ore is of too remarkable and beautiful an appearance to be easily concealed. It should be sought for in the transition or corboniferous limestone of the place, which is in other countries its usual position. In the specimens we saw, the quantity of ore is small, but its matrix is a promising one: much of the lead ore of England is found in a vein of carbonate and fluate of lime, &c. traversing the same formation of limestone. It is worthy of remark that a vein precisely agreeing with the one now the subject of discussion, (with the exception of its not showing any traces of lead,) was observed at Cape Maillard by Mr. Nixon, 66th Regt. for a description of which see page 166 of the first volume of these Transactions. Veins of this description are considered to be very metalliferous, and are often explored with great advantage.

The predominating rock on the western side of the bay appears to be a felspathic granite, or one in which the felspar is in excess, the quartz less abundant and the mica very subordinate. It is often characterized by containing garnets, and this, in the estimation of Maculloch, is a proof,

if any were wanting, of its being primary.

In our Geognostical Essay on a portion of the Saguenay country, &c. just referred to, allusion has been frequently made to the deeply decomposed surface of these rocks, by which they have acquired their remarkably whitened aspect. In this therefore we will pass it over, as well as other facts therein stated, our object being to confine ourselves almost entirely to any *new* matter collected during our second visit to St. Paul's Bay, in the Spring of 1829, leaving the first report to speak for itself.

On our former visit to this place, we obtained from Mr. Gagnon, priest, some interesting information respecting a volcanic eruption which he appears to have witnessed at the latter end of the year 1791. In the account of this event given in the Geognostical Report, an error or two appears, which we here correct; it was in the month of December and not October that this phenomenon was observed. Also for 11° au dessous du thermometre de Reaumur, (plus 7¼ of Fahr.) read 11° au dessus, &c. (plus 56. 7. of Fahr.) Neither did the 6th of December, of that year, fall on Saturday, but on Tuesday, as appears from the following extract from the journals of the period.*

Extract of a Letter from St. Paul's Bay, dated 15th December, 1791.

"On Tuesday, the 6th instant, about half after seven o'clock in the evening, we had one of the most violent

* The printed letter was rightly copied from the original manuscript, but having been written by an old gentleman, it contains a few discrepancies, originating in the failure of his memory, but which deduct nothing from the accuracy of the essential facts. He corrected the temperature himself upon our second visit. In entering these corrections in the errata to the first volome of these Transactions, a most absurd blunder has been made, which our absence from Quebec prevented the suppression of.

shocks of an earthquake ever remembered to have been felt here; it came on like the explosion of a cannon against the back of our house, which made us imagine that the roof was falling in, it was followed by the shaking of the whole frame which fairly rocked about the furniture, &c. on which we took the children in our arms and ran out of doors, expecting, as is usual, three successive shocks, but this was not the case, there came two more moderate shocks at about a minute distance from each other, after which we returned into the house expecting all was over; but we had not been long in when another most violent shock came on, and though not accompanied with the same explosion as the first, continued much longer, for we had time to leave the house again before it was ended; when without, we perceived the earth rocking under our feet—thinking it not safe to remain in the house during the night, in the intervals of the shocks we went into it, and after extinguishing all the fires and lights, retired, eighteen in number, on board the sloop, where we remained till eight o'clock next morning, in which space we felt upwards of thirty shocks,—only nine of them were severe—the heavens and the earth seemed to be convulsed; it continued alternately snowing, raining, hailing, and blowing gusts of wind from the south-west and north-east.

"The weather still continued in that state, and the earth trembling at intervals both by day and night, ever since, though none have been so severe as those of the first night. One chimney and part of another have been shook down in the parish.

AT THE EBOULEMENS,

"It was most severely felt—the church is very much damaged, only one end of it remaining sound—the crucifix

on the altar was broken by the fall, as was also the lamp, which was thrown down by the rocking of the building—three chimneys have been thrown down, but happily no lives lost, a poor woman has lost her senses by the fright, being obliged to run out naked.

AT MALBAY,

"It was not so violently felt, and we hear of no damage being sustained. No advices have been received since from the Little River.

ON THE ISLE AUX COUDRES,

"The different shocks were severely felt, but we do not learn that any accident happened.

"Every where the shocks were felt more violently in stone than in wooden houses.

"A frightful rumbling noise was heard in the mountains both in the intervals and during the shocks, which still continued when the last accounts came away, (the 16th)."

29th December.

EARTHQUKE AT ST. PAUL'S BAY, EBOULEMENS, &c.

(Accounts received since our last.)

When the latest advices came off from these places on Monday the 19th inst. the earthquake still continued to the great alarm of the inhabitants. An ingenious correspondent on the spot has favoured us with a circumstantial account, from its commencement up to that date. The following is an extract:

"All the different shocks were felt from west to east, and did most damage within the breadth of two leagues, comprehending in their course (the length of which is yet unknown) the lower part of St. Paul's Bay, striking north and south, the lower end of the Island of Coudres, and the lower part of the Eboulemens.

" Within the above space, twenty-one chimnies have been thrown down or damaged. One stone house almost entirely demolished, several others split, and many stoves and ovens broke down, besides the damage done to the church of the Eboulemens, (mentioned in our last).

" It is remarkable that during the first days the shock came on regularly at the same hour, morning and evening, —and since the 6th till now, (the 19th,) we have had at least four or five shocks every day.

" The 17th, about half after five o'clock in the evening, *a globe of fire*, appearing to the eye of the size of a forty-eight pound cannon ball, was observed coming from the south-west, striking towards the north-east, and at the height of about one hundred and forty toises, disappeared in its perpendicular descent, above St. Paul's Bay, after bursting with an explosion.

" Many old people remark that for several quarter-centuries back, earthquakes similar to the present have happened; which lasted forty days, and find their return tolerably exact every twenty-five years, to a year or two of variation, and that the present is the third which to their recollection has taken place in the same season, within the difference of a month or two.

" In the history of Canada mention is made of a more violent earthquake, in the month of July, 1663, than any felt since, having then lasted six months, and began in the preceding January.

" Dating from that period there appears to have happened one regularly every twenty-five years—for since 1663 to the present year, five quarter-centuries and three years have elapsed.

" Previous to and ever since the 6th inst. the weather

has been clouded and gloomy, particularly west and east, and whenever it cleared up (which was very seldom) it always began to darken from thence."

The existence of iron mines in the rear of St. Paul's Bay, was known in the time of Charlevoix; but the public is in possession of few facts respecting them, up to the present day. In the summer of 1827, the Surveyor General reported favourably of them, after a personal inspection. And upon our return from the Saguenay country last year, we visited these mines at the request of Mr. Andrew Stuart, (one of the Commissioners for exploring unsettled lands,) the report respecting which may be seen in the Essay before alluded to. On our departure, instructions were left for further exploring these mines, and in consequence, very favourable reports were received during the following winter. It was to test the truth of these reports, and to make additional researches, that having finished our observations at St. Paul's Bay, we commenced a tour of the valley. Ascending, as before, on the western shore of the Gouffre, we shortly reached a saw mill, situated at the foot of a fall occasioned by a branch of the river tumbling over the carboniferous limestone, dipping to the eastward. Plastic clay was observed to be in contact with the limestone, and the latter is known to succeed to primary formations here.*

In a deep section of the plastic clay near at hand, sulphuretted water was seen oozing from it. It is worthy of

* We are not in this country, at least in the Lower Province, perplexed by the presence of the secondary formation lying above the carboniferous limestone of England, salt springs and gypsum occur in the Upper Province, but it seems to be doubtful whether they are not there associated with rocks whose analogies in Europe are considered to be of earlier formation.

remark that these springs almost always appear to be issuing from the body of the clay, a fact not consonant with the character of the clays in general, which usually throw off waters. This phenomenon may, perhaps, be accounted for thus: The fetid carbonate of lime is probably the source from whence the sulphuretted hydrogen is derived, which, rising in the state of gas is absorbed by the clay, and finding an outlet, is partially converted into water, by its hydrogen attracting oxygen from the atmosphere. It may however, be explained more simply, by supposing that the sulphuretted hydrogen combines with the water in the clay.—Both cases, indeed, may occur. There appears also to be something contradictory in saying that clays (notoriously so absorbent when *dry*) throw off water; but it is well know that they do, and the reason appears to be, that in consequence of their absorbent qualities, they soon become saturated with water, in which case they will receive no more, but oblige it to traverse their surfaces.—Near this place, there is also a salt spring, situated in the lower part of the valley.

Wishing to ascertain a little more respecting the geology of the valley, we left the road to the right, and ascending an alluvial ridge, came once more upon the carboniferous lime stone. Our view from hence was magnificent. Before us lay the whitened and rounded summits of the primary chain which, bending eastward, encloses the valley to the northwards, and makes of it a species of Cul-de-Sac.—Behind us the graceful sweep of the bay, the Isle aux Coudres, and the far away blue of the south shore. Below, a singularly undulated and well cultivated alluvial country, intersected by the Gouffre.

Crossing a field or two we came upon the junction of the

primary and secondary (including the transition limestone under the latter term) rocks. This had been before observed near the second mill, on the western side of the bay. The specimens of primary rocks we collected, were, first—an aggregate composed of blackish brown mica, red felspar, and grey quartz; secondly, of felspar and quartz alone, both of a pale colour; thirdly, a trapp containing much hornblend; fourthly, micaceous schist. The limestone was the same as has been described.

Descending again into the road, we pursued our journey over alluvium, until reaching a bluff, or precipice by the road side, we stopped to dine. This bluff, which is caused by a spur from the primary chain here meeting the road, is of granite.

Some distance beyond this bluff, we crossed a plentiful stream of water, strongly impregnated with iron, and which had its source in some hills on our left hand.

The next thing that particularly attracted our notice was a species of eboulement, by which a part of the road had been broken away and thrown into the river, an event evidently of common occurrence, as many portions of the western bank attest.

It appears that the river is rapidly gaining on this bank, and receding from the eastern, a fact which is owing to the deep alluvial section that the former presents in many places, while the latter forms in general a gradual slope to the foot of the mountains, which on the eastern side is much nearer the river than on the western.

Against this section, already weakened by the general thaw, the spring torrents rush with such impetuosity as to tear away a portion of the feeble barrier opposed to them, particularly at the sudden bends of the river, where their

effect is greatest. These torrents, by undermining the bank, soon make it top heavy, and the superincumbent mass falling, is gradually removed to the bay, where a species of delta is forming. The operation of this cause is constant throughout the year, but with diminished effect, nor does there appear any prospect of its being arrested, until a decided change is effected in the course of the river, by which a large portion of the property belonging to proprietors on the western shore will be cut off and bestowed, (if the river be considered a legal boundary here,) upon their neighbours on the eastern shore. May we not expect to hear of an action being instituted one of these days, by the Seminary *versus* the heirs of Madame Drapeau?—What would be the judicial decision in such a case? In equity the Seminary has a right to its land; but so has the other party to its water lot. To sink piles or construct other expensive works in order to resist these encroaching waters, appears to be out of the question in the present state of the country, but something of the kind must eventually be done.* On the bank of this river are often seen prostrate trees deeply embedded in its sandy alluvium, and this is characteristic of much of the alluvial land of the Lower Province. In a deep section formed by a river which crosses the Charlesbourg road, near Quebec, they may be seen in some abundance. It is remarkable that these trees are generally cedars, which are now rare in these parts.

* Captain B. Hall describes similar encroachments of the Mississippi near New Orleans, but of course on a much more extensive scale. There the river, whatever alteration in its course may take place, appears to be the boundary on one side, and the inhabitants are said, in consequence, to use artificial means to increase the encroachment, although at the risk of losing more than they had previously gained.

We arrived about six o'clock at St. Urbin's, which is between four and five leagues northward of St. Paul's Bay, where passing the night, we made preparations in the morning to visit some deposites of iron ore said to occur in the mountain chain to the northward, and to test the truth of a report which had been brought to Quebec respecting the occurrence of coal hereabouts.

We had many reasons, geological as well as other, to question the accuracy of this latter report; but none of them were of so positive a nature as to render our visit to the spot unnecessary, particularly as if we had not done so, some doubt would always have existed on the subject, as it was only from seeing the total discredit with which their story was received by us, after having visited the place, and the utter hopelessness which existed of imposing upon us that we obtained from one of the conspirators the following account.

They purchased a bushel of good Newcastle coal about three weeks before our arrival, and deposited the same in a small stream in rear of St. Paul's Bay.

Fortunately there was not a geologist among them and their *bituminous* coal was deposited in defiance of the beautiful laws of nature, upon the sides, and in close contact with primary rocks, with not a vestige of a secondary or transition formation within several miles. To see was therefore to be satisfied, or rather dissatisfied, and we turned our backs upon the beautiful but meretricious charms of the wanton sparkling with all her jetty blackness at the bottom, of a pellucid stream gurgling over a fine felspathose sand, up which we were invited to walk, under the plea of collecting more of this artificial deposit, but probably with the real intention of extinguishing the flame

raised in our breasts by the view of this intrusive combustible. We returned to St. Urbin's after two days absence, having seen only one new bed of ore about twenty feet long by ten feet wide.

The little expectation which was entertained of finding coal in these parts had previously been expressed in the printed report of our former visit, and that little entirely vanished when we examined the nature of the country through which our guides conducted us in order to find it. Having bestowed some attention on the rocks in this neighbourhood, it appears to us barely possible that coal in abundance should be found towards the mouth of the river; but to seek for it towards the upper end of the valley would be waste of time. The very circumstance of the abundance of the magnetic oxide of iron in those parts is against the probability of finding it. That we failed in finding much of this ore in our trip northwards is to be attributed to the lying duplicity of our guides, who persuaded us that they knew of several localities. We are satisfied, however, that a strict search in the neighbourhood of the chain at the upper end of the valley where we were would be attended with success. Some detached fragments and small insignificant veins and embedded pieces were frequently seen.

If the motive which these men had for deceiving us were a pecuniary one, (and it is scarcely possible to conceive any other,) they must have been greatly disappointed, as they were not even paid for the days they were with us.

On the first of April, (ominous day,) 1829, two of these men communicated to several gentlemen in Quebec, the story of the abundance of coal in rear of St. Paul's Bay, and endeavoured to extort money in consequence; but we are

pleased in being able to add that their attempts were vain. It was fortunate that one of our party, (Mr. Bowen,) staid behind to explore in the neighbourhood of St. Urbin's, otherwise the two days of our absence would have proved a loss of time of some importance, as the period of our stay was limited. This gentleman exerted himself so successfully during these two days, as to confirm all former reports respecting the abundance of ore, and to discover new localities; to his journal, we refer our readers for the details.

The position of these mines situated near both banks of the Gouffre, a river which at its shallowest periods might easily be rendered navigable for bateaux;—the abundance of limestone as a flux for the ore;—the ample supply of wood for making charcoal, render this spot well deserving the notice of government, or of some private capitalists.—The ore is of that excellent description called magnetic oxide of iron by mineralogists, or rock ore by miners. It sometimes occurs solid and free from admixture, at others it is mixed up with fusible minerals, so that if the latter is not so rich in metal, neither is it so difficult to fuse; there is also, as might be expected, bog ore in the low grounds, but how much has not been ascertained. On both sides of the river there is an excellent road, and the occasional occurrence of small streams descending from the hills affords the opportunity of working machinery, by water. In short the only thing which occurs to us as wanting to render the position complete, is the discovery of a good fire stone, such as is found near Mr. Bell's establishment on the St. Maurice river. Even this might be found, to the probability of which there is no geological objection; that at the forges belonging to the old red sandstone

formation which might be expected to occur amongst the rocks enclosing the bay.

By assuming only two feet for the depth of the ore, (and the depth is just as likely to be fifty,) and computing from the extent of the surface of that alone which has been seen,—we obtained seven thousand tons as the result, which, if multiplied by one hundred will, in our opinion, produce an amount which will fall short of the number of tons of magnetic iron, of which this neighbourhood is the depository. As we have hinted before, the eastern side of the river belongs to Madame Drapeau, the western to the Seminary;—the latter possesses, by virtue of its title deeds, the absolute controul over all mines and minerals whatsoever.

GRAMMAR *of the* HURON LANGUAGE, *by a Missionary of the Village of Huron Indians at* LORETTE, *near Quebec, found amongst the papers of the Mission, and Translated from the Latin, by Mr.* JOHN WILKIE.

A K Ch X D E G H I N O S R S T θ V Y.

NOTE 1.—K X and θ are pronounced as in Greek.—G and Y are almost the same as to pronunciation; this last is sounded like the vowel *i*, and is thus written—*ˌandatara*, as if it were *iandatara*—bread; *ˌandatarˌa*, as if it were read *iandataraie*—to eat bread.

NOTE 2.—Ch is sometimes pronounced as in French in this word *chaste, cha-ha*—thou assentest; oftener, however, as the Italian C, thus—*chieons*—thou art sick.

NOTE 3.—D in the beginning of a word is sounded as *nd;* as *ndiʁ* for *diʁ;* but in the end of a word, like the Greek *u*, as *Ihrend*, as if it were *Ihrenu*—he was coming here.

NOTE 4.—E may be marked by three accents, acute, circumflex, and grave, and varies in sound according to the various sound of the accents. When it has the *acute*, it is sounded as the French masculine *e* in *divinité*, as *ié*—I come. If circumflected, it sounds as the French word *dais*, *mɑnnoie;* example, *ondê*, as if it were *ondaie*—he or she that. And if it has the grave accent, it has a middle sound between both, as *ay* in French, example—*i,erhè*—I wish, I think.

NOTE 5.—H is always a consonant, and is always sounded with an aspiration. I is never a consonant.

NOTE 6.—N, when it is written alone, does not sound with the following vowel, as *ǫ̈nʁe*—man.

NOTE 7.—R is duplicate, as in Greek, viz. R lenis and R aspirate. The lenis is that which is marked with a light or no spiritus, as *,a'ronta*—a tree, *arenda*—ceremony; but the aspirate is that which is marked with the spiritus asper, and gives a rough sound, as *,arᶜonta, ,arᶜenda*—a rock.

NOTE 8.—S is never pronounced as z, but as *s s, ex. asara*—a handle of a kettle.

NOTE 9.—I and 8 often make but one syllable, with a vowel or diphthong following, as *kʁaraskʁa*—let us go; *chiǫ̈nʁesen*—you are liberal; *tiǫ̈nʁessan*—we are liberal; all which are trisyllables: and when they are marked with two

points, they do not make one syllable but two, with a vowel or diphthong following, as *hotïai*—they have cut; a quadrisyllable, while *hotiage* is a trisyllable, signifying he is cut. So *eskion* signifies I will enter; and *eskïon*, a trisyllable, these two will enter.

The Parts of this Grammar are three.

The first part contains Nouns, Pronouns, and Adverbs. The second part contains Verbs. The third and last Syntax.

OF NOUNS.

Nouns are not declined by cases, and therefore do not suffer any alteration by another noun or verb, unless they enter into composition with them, as *onnenhà*—wheat; whether prefixed, or placed after the verb, *ˌaiéhsas*—I have need, it is always the same, and remains in the same mood; and you may say *onnenha aˌiehsas*—I want corn; or *aˌiehsas onnenha*. To express the plural, *s* is often added, *chieˌannen ionnenhas*, or *onnen hsannens*—these are large grains of wheat. But in the singular *chieˌannen ionnenha*—it is a large grain of wheat. So *haˌsannen*—he is an old man; and *hatiˌsannens*—they are old men.

OF PRONOUNS.

They are not declined, but are put in all numbers and genders without variation; as, *endi*, signifying I, we both, we all. *Sa*, or *isa*, signify ye, ye both, and ye many.—*Ondaie*, signifies he, she, that, they, those; *xa*, or *dexa*, or *decha*—this, that, these, those; *xonʻdaie*—he, the, that; *chondaie*—it is just that; *nde*—who, which, what; *tsinnen*, or *tsaʻteniaon*, or *xaisend?*—who comes here? *annʻenrʻonnon*—of whom, or, of which are you; you both, or, all of you?

Of the possessive pronouns, my, thy, his.

They are thus expressed: *endianda hiaʋan*—my knife, I possess that knife; *isa sandahiaʋan*—your knife; *ondaie hondahiaʋan*—his knife, or, he possesses this knife. A final is added to uncompounded syllables, as, *endi aennaoa*—my kettle; *isa sannaoa*—thy kettle; *on'daie onnaoa*—his kettle; *endia itsi chia*—my net. They are often made possessives without the addition of the *a* final, only by using the example *s* in the place of example *chi;* for example, *sannon chiaʋasti*—thy house is fine; *sandʋchachen*—your coat is bad; except *ondaon*—to have a hut, a house, because it is conjugated by the example *chi,* and may have a possessive signification, as *endi,ondaon*—my house; *isa chiondaon*—thy house; *andaie ondaon*—his house; but what belongs to parts of the body, as the hand, arm, &c. we use the paradigma *ch,* or *s,* just as they are from their nature of the paradigma *s,* or *ch.* Thus because *,a,onresa*—the hand; *,aiachia*—the arm; *,a,ondia*—the nose, &c. are of the paradigma *chi,* we say *chie,onr'esa*—thy hand; *chieiachia*—thy arm. But because *aʋerochia*—the hair; *oskota*—the head; *oachia*—the breast, &c. are of the paradigma *s;* we say *sero chia*—thy hair; *saskota*—thy head; *saachia,e,* or *saaske*—thy breast does not pain thee.

Note.—These possessives, my, thy, his, their, are often expressed by the word *aonhʋa,* of the fifth conjugation; for example, *a,atondot ontion d'a,onhʋa a,atondotaʋan*—I have thrown off my clothes; *satondotontion desonhʋa satondota ʋan*—thou hast thrown off thy clothes; *hotondotontion d'ahonhʋa hotondotaʋan*—he has thrown off his clothes; from *tondota,* clothes, and *ontion*—to throw. In composition we say *ontion,* not in composition *ation.*

But these possessive pronouns, I me, thou thee, he him,

joined with verbs, take the passive voice; example, for *chiennionronniak*—you make snow shoes, say *chiatennionronniak*—you are making snow shoes for yourself; for *achishar ichien*—you are making a coat, say *achien dishari chien*, from *ˌenonʻhara*—cloth, and *ichiai*—to make. When by neuter passives is signified any thing which is to the loss of the possessor, then the end of the word is changed into the particle *sennik*, which always gives to the word, the paradigma *s. ex.* from *aʻkwentas*—the shoes are wearing out, say *aˌaʻkwenta sennik*, as if it were, my shoes are wearing out. In like manner, instead of *ondschátexa*—the gown burns, say *ondschátesennik*—her gown burns; *andschateˌasennik*—mine, &c.; *sandschateˌasennik*—thine, &c.

The same thing happens in possessives, when their final is changed into a figurative mark of relation *ex.* from *otaseti*—that is hid, say *otáseʻtandi*—that is hid from her; *aˌataʻseʻtandi*—from me; *sataseʻtandi*—from thee; *hotaʻseʻntandi*—from him.

OF ADVERBS.

ADVERBS OF PLACE, are:

Anʻnen,	Where, whither, which way whence.
Xa, or *exa*, or *dexa*,	Here, hither, this way, hence.
θo,	There, that way, thither, from thence, &c.

As for example:

Anʻnenaʻotaˌeisachiatorha?	Where hast thou pain?
Xaaoʻtaˌeaˌechiatorha,	It is here that I have pain.

(From—*Achiatorha, ndeheren*—At a distance, it is far.)

Troskenhen,	Near.
ˌAro,	On this side.
Endesˌa eʻchi,	On the further side.

By inserting the ʁ—As for example:

Chiaʁatenr'at,e,	On the other side of the wall.
,Andaʁa,	A river.
Hence—*Chia,an'daʁati,*	On the other side of the river.

Chi, or *echia,* takes *a* after it, and requires *ti* after the substantive.

I'tskati,	On the other side, (as, on the other side of the water.)
Itskati a,andaʁati, or, *chia,-a'ndaʁati,* or *a,andaʁateksi,* from *andaʁa,* and *ennenti,*	To descend.
On'daonnentaksi,	The *Cote de Beaupré.*
Tiondiondi,	Where there is a point.
Eka'nda otrahsi,	At the Falls of Montmorency.
(From—*Otrahsi,*	At the rock.)
,Andat,ae,	At the country town, at the town, or, at the deserted village.
Ateondeche,	In each country.

ADVERBS OF TIME.

'Onnianni,	Long.
Eonniannik,	It will require much time.
And—*So'nniannika,*	In a short time, in a little.
Onhʁa ϑat,	Immediately.
Chie,'annen aondesa,	That will last a long time.
Aondaʁaha,	That will last me but a very short time.
Iaondaʁandihaϑo onhʁa,	Now.
Onhʁaotia,ion, or *eksa,ion,*	I came long ago,
Achia, or *onhʁa achia,*	Now for the first time.
A,on,	To arrive.
Onhʁaaonihoon,	He is newly arrived.

Achia, or *achiato ahar'one,*	It is the first time he has heard it.
From—*Ar'on,e,*	To hear.
For—*Ronxa onhsati chihoon,*	He has arrived a long time ago.
Achietek,	Yesterday, or tomorrow.
Chiachietek,	Three days ago.
Ennhiek,	Last year.
Chiennhie,k,	Two years ago.
Xa,en'de,	At the hour or season that it is.
θoha,on,e,	It was in that time or that season.
θoinnonhsa, with	It might be in that place, or at that time.
Innonhsa, signifies	Doubt.
'Annenha,on,e ahatonnia,	When was he born?
From—*Otondi,*	To be made.
Xa,ende ihotondi,	He was born at that time.
θoichienihotondi sondatierontiend?	Was he born then, (he may be named) when the victorious soldiers returned?
Asonorahsion,	In the morning.
Asos,	Again,
Orahsi,	Night.
Asonorahsik,	Tomorrow morning.
Asonorahsinnen,	In the morning.
Entieki,ar,	It is noon.
I,ar,	The sun.
Entiek,	Noon.
Askatie,arokvi,	It is after noon.
Askatie,arakvik,	It will be afternoon.
Onna,aratie,	See how late it is.

Tie is added after a vowel, *hatie*, after a consonant.

De,aratie,	To night.
Tetenre,	Some time during the night.
Etiórant'di,	Very early in the night.
Asonθenk,	Midnight,
For—*Asonteahenk,*	The middle.
Ontaotratie,	The sun will soon rise.
Onta—signifies	Proximity to a future or coming event.
Onnéi,ar,	The sun is up.
Aondechenhaon,	Always, perpetually, as long as the world shall last.

Enhaon, In composition, out of composition.

A,on.	To carry.
Aondechenhaon aθatien,	He was from all eternity.
Asontenhaon,	All the night.
Asentenhaon,	All the day.
Ate,on,	At each time.
O,ennhenhaon,	All the summer.
Eo,enrati, or, *e,a,ennhi'ksi,*	Continual summer.
Ao,henhaon,	The whole length of winter.
Atesenta,e,	Daily.
Atentasenra'θe', or, *onwarhen'ehe,* or, *esaonsa,* or, *henhaserh onhsaiones'on*	From day to day we think he he will arrive today.
Annhenha,on,e,	When?
Achietekaon,	Since yesterday.
Tesenta,ek,	Two days hence,
Achin,kasenta,ek,	Three days hence.
Iso'onhaon,	Since his return,
O,enr'axe,	In spring.

ʻO'che,	In winter,
Deʻa'enra,	When spring will have come.
O'enraken'de,	During spring.
De'ochat,	When winter shall arrive.
Ochendeteontendaɵhas,	We go to hunt during winter.
ɵa'ennhe'e,	During summer.
Annenda'e,	During autumn.
Aiostore'ska,	It will be soon.
Ason,	Not yet.
Onnehioon,	He is already arrived.
Achietek ekɵa'e'in'nen,	I have not eaten since yesterday.
Sehɵen,	Wait.
Eskenhatie,	Ever and anon.
Aɵatichien i'enhatie.	A little after.
Chi and *Sorhenha,*	After tomorrow.

ADVERBS OF NUMBER.

Skat,	Once.
Skiatat,	I am alone.
Skenonharaa'ti,	A single coat.
Skaɵen daratietieɵhis tonta ɵa,	We ring a bell by tolling it.
Skɵentaratiehon a'oraskɵati hatie,	We walk each day without resting.
Tenditehoté chen' ɵi,	He struck it twice.
Achink,	Thrice.
(From *Atocha*—Struck, and *Enti*—To make fall)	
Etsa'kiɵo, or, *Etsak,* or *etrakaɵo,*	Often.
ɵoraahatatia,	He often spoke.
ɵoiaɵo,	Seldom.

ȣaθo, Once more.

O¸onno'ndaie, There is but that. (Hence)

Aonde'chon for *aondecha¸on,* The country is destitute of people.

Onȣentroneke, In a desert place, where there was nobody.

A¸on, Within.

Chiata¸on, In your belly, or, in the belly of. *(ex. ch.)*

Osieta¸on, An empty bottle.

ADVERBS OF QUALITY.

¸Andeia aonnianni, or'aȣan, orihierichen, Well, rightly.

ȣkaot, Standing.

Onnianni, te or'aȣan, Badly.

Araiθoti¸andeiaa, or, *onnianni,* That is altogether well.

On'daieon¸ endïer'aten, That is what augments my pain.

Ondaieondieraθa, or, *ekandera'ta' kȣa,* That which is worse.

Ondaie endïe raθa, There is what augments the pain.

Ondi¸onhia¸i, Useless, that which serves for no purpose.

Tiaȣennonti, By a snare.

He¸enkichienonek, Only to appearance; up to the mouth.

Hoȣendsskononek hatatiak, He speaks to the extent of his voice.

Tihatatiaka onekarai θochien tihatatiak, He speaks at random.

Or—*Hatatiak ichien anek hastra,e onek,*	Only to the lips.
Ka,oni tachien hasendaratie,	He speaks of this and of that.
Atonditenr,	It is through compassion.
Serian'di aonda,on,e, or, *osatso,on,e,*	Upon the bare flesh.
Etisrati,	It is dark.
Tserhadek,	It is day.

Sten, in composition with a substantive, signifies measure or quality, as,

Taoten tia,arihsten,	Which is your book?
Teonnianniti chiatsten, or, *chiesendsten,*	I do not approve of his manner of acting.
Taotichiatsten,	How art thou made?

ADVERBS OF AFFIRMING AND DENYING.

Staan—not; but when it is joined to the word following we use *stante,* or *te* only. The personal mood often has the power of denying, when pronounced interrogatively; as,

Ahentrontai,	He is not there.
Tesasteso, or, *Okrito,*	The voice of one who is indignant,—I will not.
Ndioharon,	Away.
Ennon,	A word of prohibition.
T'a,aketaska, or, *A,aketatatichien,*	For the future negative.
Te,aketade,	I have much to do.
Aoo,	Yes.
Kwadet,	For fear that. It governs the aorist.
As—*Kwadet anwanderai,*	That I may not sin.

ADVERBS OF DESIRING AND ENCOURAGING.

Te,ato,ensen,	Is not that true?
Te,ake'tas asen,	I wish that I may or might carry it.
Teake'taskasen, tesa aketatisen,	That I did not carry it.*
Ta sente, aketas,	God grant that I do not carry it.
θo,	That I may see.
θo θo io'tik,	That that may be thus.
Ndiohneia,	Come, or, come ye.
Ndiosen,	I pray, as a favor.
Etsaeon,	Prosper, I say.
Estennia,on,	Be ye prosperous, I say.

ADVERBS OF INTERROGATION AND DOUBT.

Aon,i, or, *ksaio'ti ndiaseron,*	Whether.
Troten, or, *taot hao'ten,*	When?
Taotioti,	Wherefore?
Taotasten, or *taoti,aristen,*	What is the matter?
Sator'onton taotio'ti de,andata,e,	Inquire what is going on in the village.
Saotexio'ti tesatonde,	Why can it not be done?
Ta,onioska, or, *tatichien ta',onioska,*	Why should I kill thee?
Tsaten, or, *tsinnenxaisend,*	Who comes here?
Endiatichiena,enk,	Should it be mine?
Onhsa de ahaonθ	He might come today.
Etsa,onsen ehotieronk,	He might have made the attempt.
Stanito chien haoten,	I know not what it is.

* Que ne portais-je.

Anni'aten iθochien, or *tsaten iθochien*,	I know not who it is.
Stan iθochien eaxenk,	By chance.
Staniθochien eo'tik ehaon,	He will come by chance.
Staniθochien haatsi,	I know not how he may be called.
Anniaten iθochien axaskatannont,	Give me that in what quantity you please.
Anno'aten iθochien ionhi,	I do not know what length.
Chieske,	What do I know?
A'ato'enk,	That might be, that may be true.
Taier enθo,	Why not?
Hechon non hxa a'enk,	Perhaps it was.
Hechon, ato'ennonhxa a'okxasti,	He is, perhaps, at his ease.

ADVERBS OF COLLECTING.

Chiate hotion, if the aorist is used, say, *chiaθation*,—they came at the same time. *Tsinnen teste*,—with whom are you? It is answered, *hechonte andi*,—I am with *Hechon*. —But in the plural, is said *θoitson*,—how many are there of you? Answer, *aki'aion*,—we are four; or, *axaseci*.

Ondaie e'ise'ik 'enshara,	That will be with the cloth.
Titsatont,	Put yourselves together you two.
Titsatrande'en,	Seat yourselves near each other.
Tsihxechatia,	Go from the company.
Ondatonr'onton, or, *ondakate'ahonk*,	There are many bustards. wild geese
O'otio'kxannen,	There is much people.

ADVERBS OF LIKENESS AND SAMENESS.

θoio'ti,	As if.
θoeo'tik,	Thus it will be.
θo ai'otin'nen,	Thus the thing was.
Iθon'di,	Alike.
Chiate,arihsten,	It is the same.
Chia,at, or *chia,arihsat,* or *skarihsat,*	It is the same thing.
Chiateo'ti,	It is all one; the one is worth the other; the one is worth as much as the other.
Chiate, arihsan,	It is the same thing.
Chiateon,indionrsten,	We have both of us the same thought; we are of the same mind.
Chiaa,iatat,	We are the same.
Tson,indi,onrat,	We have both of us the same thought.
Hechon,e ir'a,	He is as big as Hechon.
Ahaatsten,	That is his custom,
Ahonnon dechsten,	It is the custom of their country; the fashion.

ADVERBS OF QUANTITY AND EXCESS.

Okenie,—a little; or, *isaia,*—moderately.

A'soniskoia di,aen,	There is still a little.
Onne, or *onnaion,*	There is enough.
A'son,	There is not enough.
Skata'son,	There is still a little wanting.
Otonr'onton, or, *sannen,*	Much.
As—*sannen, aiotiendiska,*	That should give a good deal; or, should satisfy so much as to have something remaining.

A¸ẅannenk,	There must be a good deal.
Atrondi,	That is honestly.
Atrondihaienhẅi,	He knows well enough.
θoir'ati chia,	He is as tall as you.
θoiẅa,	How large is it?
Xaiontsi,	The size of that (showing for example a hut.)
Skatenchat,	A fathom.
Achink ate¸aten,	Three fathoms.
Oentáskẅi,	A little stick.
Aentaẅak,	A short stick.
Atiaondi¸andaẅate,	Not.
ẅandeẅate, otenrondi,	Not at all.
Onder'ati,	Too much.
Daat echi etsonder'ati,	Much more.
Ekender'ataẅa,	That is still worse.
Iskandeia,	That is but too good.
Itsẅkaot,	That is but too bad.
Iso'ki¸ẅannen,	He is too rich.
Ondaieaat eθarontio, or, *eθaẅendio,*	It is the great master.
Eneθo ẅnek,	It is but grease.
A¸atieron xẅaska,	I would be too strong.

(They use this phrase when they resist any thing intended.)

Aiotendiska,	That must last a long time.
Aiokenieska,	Should I be content with so little.

ADVERBS OF NEARNESS AND DISTANCE.

Tioskehen, or, *oskehen,*	Quite near.
Aehennonk,	In the middle.
Tioskeken ate¸iatre desa skẅan,	To give.

Chia de handare, (let it be a name)	Your town is near that of N.
Teonsan datande'en,	Our town is near your's.
Teau'iondes 6e'en,	Our country is bordering upon your's.
Teon'sennons 6e'en,	Our house is nigh your s.
Te hiende hoxen,	The doors of the two houses are opposite to each other.
Te hsendihoka,	Let us put our doors opposite to each other.
Eoonti,	We are going there in a day.
Eokahsi,	It is in sight; we see it from this place.
Skato tosan,	There is but one sleeping place on the road.
Te otito'eti onnontst,	There is a mountain opposite.
Etionte ro ketaidé eiai,	In firing from the bastion we shall have opposite to us those who are along the curtain; we shall graze all the curtain in firing.
Teondo'en,	In the middle of the place.
Teonsandato'en,	In the middle of our towns.
Teon'ionhsent so'en,	In the middle of our country.
Chiato'annen,	In thy bosom.
Teon'itsenhia,	We are both of us opposite each other, having the fire between us.
Tea'iatakannr'a,	Face to face.
Tea'iatrandi'enk,	We are near enough to each other.
Tioskehenichiede chrihsiost,	You will believe soon.

Asoni θochiente Skɘa,ierichen, I am not wholly cured yet.

Observe, 1o.—Adverbs for the most part are declined by tenses as impersonal verbs. So from the adverb *onder'ati* —greatly, is made *onder'atinnen*—it was very much;

A,anderat,	It will be very much.
Aionderatik,	It might be very much.
Aionder'atinnen,	It might have been quite another thing.
Atrondi,ehen,	It was enough.
θoio'ti,	Thus the thing is.
θoeo'tik,	Thus the thing will be.
θo io'tinn'en,	Thus the thing had been.
θo aio'tinn'en,	Thus the thing might have been.
Eo'tis,	All those things are (for example) of the same price.
Ndeheren,	At a distance.
Ndeherennen,	It was, or it had been at a distance.
Tioskehen,	Near.
Tioskehen ,ehen,	It is, or, it was near.
Itsoskehen,	He is but too near.
Isteheren,	It is too far; (from *ndeheren.*)
Iskandeiaa,	That is but too well.
Itsɘkaot,	That is too bad.

2o.—Some adverbs pass into nouns, and are conjugated thus:—

Sander'at,	Thou art troublesome, insolent.
Honderat,	He is impertinent.
Standeɘander'at,	I am not excessive, be it to ask or to take all.

From the adverb *arderati.* From *io'ti*, in the same manner.

Eonsatis,	We are equal.
Eskwatis,	Ye are equal.
Chiateondi'té,	They are of the same quality.
From—*Ets,aon,*	Courage.
E,ets,aon,	I will take courage.
Echietsa,on,	Thou wilt take courage.
Ehatsa,on,	He will take courage.
Ea,istenni,a,	We two take courage.
Etsistennia,on, and *Eskwastennia,on,*	Let you and us take courage.
Ahatisten nia,on,	Let them take courage.

3o.—They sometimes enter into composition, as

Harihwander'atannonk,	He exaggerates.

4o.—Some require the future after them; as,

Sehwen,	Wait, or, wait ye.
Chieskechien,	In order to.
Tse, or, *ennonne,*	A word of prohibition.
Tewastaßo,	A word of refusal.
,Ato,en,	In order to.
Sehwen echiaraskwa,	Expect to go.
Ennochien, or, *tewastaßo echiaraskwa,*	Do not depart.
Hesehets aron dediw,ato,en eorhientenr, or	Pray to God that he may have pity onyou,
Chieskechien ehientenr de diw,	(Let it be a name.)
Ehaon,andiare, chiadesa echiaraskwa,	After that (the name) will have come, thou shalt go.

5o.—Some require the aorist; as,

Kwede,	For fear that; in order to; perhaps.

A'ro andes'a,	After.
Chiandeta,	Before (that is a name).
Hesenditan'da kwade t'ahi-entenr,	Go away and pray (N) perhaps he will have pity on you.
Ennon chriwanderai, kwe non-dechon tachiatet sin'at,	Do not sin for fear you be damned.
Chia'andawati andesa,	Some water.
'Aroa'andakwati,	After the baptism.
Chiaa'iatat,	I and he.
Chietiatat,	I and you, we two are but one.

In the same manner is construed *achawi*, as

Achawiaao'chin'otati,	Above the knee.

60.—When there are two adverbs, or a noun with an adverb, they are put before the verb; but which of them ought immediately to precede the verb will be shown by the following examples :—

Staniwaia te'onrakwa,	I do not fear at all.
'Wannentesaien askatenraha,	If you had much you would give me part.
Stanbo te'aeren,	That was not done so.
Stanxatewate'waien,	I have not the bigness of that, (that is the point of my finger).
Te'ato'en te soon,	It is not true that he was returned.

In which, you see, *te*, whether it signifies not, or if, adheres immediately to the verb; except when the negative *te* agrees with *chi*, signifying before; for then *chi* closely adheres to the verb, and *te* is changed into *ta*, as :—

Stanta chiwa'ien,	I never had any.

Stanta chiʋa, a'keronchend d'ason teʋarihʋiosti, I should not have even fear, though I had not thy faith.

But *chi* in a concurse with the affirmative *te*, goes before it and intermingles *a* with it, as;

Chiateha'sen Xʋaskʋa, He was crying before.

In like manner when *chi*, signifying far, meets with *te* whether affirmative or negative, it does not adhere closely to the verb; as,

Stanchiteʋa,eti, I will not go far.

Stanchite,ϑa, I am not going far.

When the negative *te* meets with the affirmative *te*, or with *ϑe* signifying if, then it goes before it, and changes its *e* final into *a*, as;

A,onioϑatechache, I kill you if you do not consent.

Onde'chon echia tetserattate chri hʋiostan'di, or *ontate sarihʋosti stanteo,enr'ontate ha'senxʋach*, or *stanteo,enr'on statehasen kʋach*, It is not for a little that he cries, or, if he cries inconsolably.

When *ti* or *sti* precede *te* they change the final *i* into *a*, as;

Stanϑo te eerhatate ϑistentondi, We do so no more at the age you two are.

When the negative *te* meets with the verb *chi,entakʋi*, to do on purpose, it is thus placed after it;

Chiʋa,istakʋite,en, I did not do that on purpose.

When any verb wants the negative tense, then we make use of the personal affirmative, as I will not do it on purpose.

Chia,itakatechien, Would I do it on purpose?

Chia,on,itakʋikati chien, Would I have done it on purpose?

Tsinnen and *tsaten* which are always of the feminine gender and singular number, as;

Tsinnen ontase endesa, Who is that who comes?

Annerʿonnon can be of both genders and numbers, as;

Annerʿonnon dʿahaonsac-hien, Of what country are those who have killed us.

Some particles are always put after, as; *asen, skenretasken, ati, ondaieati*; as

Ta,itenʿrasen, or, *ta,iten-rasken,* Pray have pity on me.

Tatichien, And why then?

Ihatonkati, He says then.

Sen and *onek* sometimes precede, and sometimes are put after;

Tasente, aketas, God grant that I may not carry.

Te ,aketaska, That I do not carry.

Onekharihoniak, He tells a story at pleasure.

,Eneθʿonek, It is only grease.

Orihaskon onekhatendot, He relates the affair without reason.

Many French adverbs are expressed by verbs, as;

Saθaʿrat tarihsarinsten, Instruct me well.

When *aθarʿati* supplies the place of the adverb, well.

Saksichoton xahatser, Do that briskly.

Sateiennondia, or, *tiseheta-ton.* Act rightly.

Sateiaʿtahadechiatrio, Fight generously.

Hatiso,ihatié, They go together.

Achinkihennonhatie, They are all three together.

A,atetsirtiʿa,endi,onrʿsan-nen, I have a fearful mind.

Okidechate ondi,onrʿsannen, She has a great mind.

Eθaonda,ensa'ti, or, *eθoton dore hondi,on r'askst,* or, *otentondi te hondi,ont,* or, *,andesate tehondiont,* — He has no spirit, he is altogether a poor spirited man.

Ondêhaoten hiatsten d'dsetenrhai, d'dsennon hseha, — He is worthy of compassion, or of affection.

The word *sten* joined to a substantive signifies the manner, or the quality, or the material from which, as,

Taotichi atsten, — How art thou made?

Teonnianniti chiatsten, or, *chiesendsten,* — I do not approve of his manner of acting or of speaking.

Taotenti a,arihsten desarihsa san, — How is your book made?

Oshista a,asetsten, — A metal bottle, as of brass.

Some words are taken declinable and indeclinable, ex. *onse, oki:—Etsihenstatsi,* as,

Oki satatonnia, — Deeds of the devil.

Onse saton. — Make yourself a man.

Etsihenstatsi et hoton, — He has since become a Jesuit.

Nouns signifying animated things are conjugated; those signifying other things are not; thus we do not say

Achink atinnonohia, but *achink i,annon chia,e,* or rather, *i,annonske achink ihatindiahaon,* — Three males.

We say—*Achink i,aata,etiasennon,o,* — Three eels, or how many eels?

The second part of this Grammar contains Verbs, whether simple or relative. There are five conjugations of simple verbs, which are distinguished by the initial syllable of the infinitive.

The first is in *a*—as *akétati*—to carry.
The second in *ga*—as *ˌaθeti*—to pound, to grind.
The third in *e*—as *ehiarandi*—to remember.
The fourth in *ge*—as *geneon*—to die.
The fifth in *o*—as *oriti*—to season.

The Hurons want the infinitive, but we take the perfect for the infinitive.

Verbs are of two kinds, as among the Latins, the personal and impersonal.

There is a double paradigma, or method of declining a whole verb, or at least some of its tenses. The one is called the paradigma *chi*, when the second person singular begins by *ch*. The other is called the paradigma *s*, when the same person begins with *s*.

There are three numbers as among the Greeks.

The personal verb is manifold, namely, the active, the relative, the passive, the neuter reciprocal, the common, the deponent; add the relative passive, the neuter acquisitive, and verbs signifying motion.

The simple and active verb is that which signifies action without respect to any person, as *ˌahiaton*—to write.

The relative is that which regards any person, as *ˌachiendaen*—to cultivate any one's acquaintance; and is twofold, namely, the one from its nature regarding any person, as *achiendaen*; the other, which from being absolute becomes relative by the addition of a final increment, as *ˌaθeθandi*—to grind for any person, from *aθeθi*—to grind. It is also relative when derived from another relative, as *ˌaatiaˌindi*

—to cut a piece of an animal for any one, derived from the relative, *ˌaatiaˌi*—to cut an animal into pieces. Moreover the verb is not said to be relative unless it regards a living object, but is of either paradigma, according to the idea to be expressed by it, whether passive or active. When active, it does not require the paradigma *ch*, as *haˌhiendaenk*—he cultivates her acquaintance; but when passive, the paradigma *s*, as *hochiendaenk*—his acquaintance is cultivated by her.

The passive is formed from the active, either by the encrease of the initial *at*, or *end*; or by changing the conjugation of the active verb into another. Thus *ataʿseti*—to be concealed, from *aseʿti*—to conceal. *Endisharicʿhiai*, from *erisharicʿheai*—to make a garment; *iʿchondi*—to dress one's self, or, to be dressed. Of the first conjugation, *aˌachondi*. Of the second, to accommodate.

The reciprocal is formed from the passive by the addition of the initial encrease at, *atataʿseʿti*—to be hid between, to hide one's self.

The neuter is that which does not signify action, as, *ˌannonhsandi*—to be sick; of the paradigma *s*, *enheon*—to die.

The common is that which has a double signification; one simple, the other relative, as, *onnhe*—to live, and to give life to any one.

The deponent is that which having a passive sound, has an active signification as *atennhandi*—to hire workmen; from *annhandi*—to govern, in like manner *ateiensti*—to learn; *aˌaiensti*—to teach.

The relative-passive is that which may have a relative signification having a passive sound, as, *atenʿdoton*—to relate, from *ˌandoton*—to relate; *ataʿronton*—to be inform-

ed of the condition of any one, from *aronton*—to interrogate any one.—Thus *atiatontaʋandi*—to escape from some one, from *ˌaátontaʋandi*—to take prisoners from any one.

The neuter-acquisitive is a verb derived from the neuter which signifies any thing that may happen to the advantage or disadvantage of any one, as from *ateˌen*—to burn, is derived *ateˌasenni*—to burn for any one. These verbs are of the paradigma *s*.

Add to these some impersonal verbs, as *iondʋs*—it rains; *ianhʋens*—it snows, and similar ones, which when they are said to happen to the advantage or disadvantage of man become personal of the paradigma *s*, as *eonˌ iondʋt*—it will rain upon us; *eonˌsahʋenha*—it will snow upon us; *aˌondʋs*—it rains upon me.

The Hurons may derive from one primitive verb many others which add a new signification to the primitive *one*, as from *otenˌen*—to burn, are derived the following :—

Ateˌasenne,	To burn for any one.
Ateˌati	To light a fire.
Ateˌatandi,	To light a fire for any one.
ˌAatateˌatandi,—from	To burn some animal for any one.
Aˌatateˌati,	To burn some animal.
ˌAatateˌaθaksi,	To make use of something, to to burn a living thing.

The impersonal verb is double. The first signifies any thing not depending upon the will, and co-operation of man, as;

Iokʋas,	It blows.
Ondennon,	It is calm.
Oθorʿé,	It is cold.
Otarihati,	It is warm.

These are declined like the third person singular feminine, as;

Iondʊs,	It rains.
Ondʊskʊa,	It was raining.
Aondʊsti,	It rained.
Aondʊstinnen,	It had rained.
Eondʊst,	It will rain.
Aondʊst,	It will rain immediately.
Orast aiondʊskʊa,	It would rain again.

The second involves in its signification one or some men indeterminately, as, he is rubbed, *eθeθa,* and formed altogether from the personal by preserving its conjugation and the paradigma of its tense, as, *eθeθak*—he was rubbed, like the paradigma *ch,* and *aʿoθeti*—it hath been rubbed, of, the paradigma *s.*

Verbs signifying motion are of two kinds, some take after them one of the particles *hor, non, xon, ron, son, θon.* Others add *tion* or *hation* to the termination of the infinitive as, *ʿahiatontion, aʿtherʿation aras kʊanhation.*

OF THE MOODS AND TENSES OF VERBS.

There are six moods; the indicative, the imperative, the optative, the subjunctive, the personal, and the infinitive.

We call the personal or conditional mood that which answers to the French termination in Rois, as;

Aʿeθet,	I should bruise.
Aonʿeθetinnen,	I should have bruised.

The personal mood is often used to signify negation, as;

Ahaiennron,	Would he be bad? for
Tehaiennron,	He is not bad.

In like manner, it is often used for the future negative; as *ahaon ati chien,* or, *tatichien ȧhaon,* for *stanatiaondi*

te haon de—he will not arrive for certain; or *tatiehien tahaon honi.*

There are nine tenses—the present, the imperfect, the perfect, the future affirmative, the future negative, the future of continuation, and the first and second aorist.

There are four primitive tenses from which the others are formed, namely—the present infirmitive, the present indicative, the future affirmative, and the future negative. From the present infinitive are formed, the present indicative and perfect, whose final is the same as the infinitive. From the present indicative is formed the imperfect, by the addition of some final increment. From the imperfect is formed the future of continuation; as *e,eθe θai*—I will continue to pound, from the imperfect *e,eθe θak*; *k* passing into the diminutive g. Also, *e,araskʉaskʉa*—I will continue to walk, from *araskʉaskʉa*, *skʉa* passing into *ska.*

Moreover, the present indicative, the imperfect, the future of continuation, and the second aorist, are allied tenses, both because the latter are derived from the former, and because they are of the same paradigma. From the perfect are formed the pluperfect. They are also allied tenses for the reasons just explained.

The pluperfect, for the most part, takes *nnen* after the final of the perfect.

The future is mixed with the preterite, and the preterite conditional adds only k. Thus, from

A,eθeti,	I have rubbed—are formed
A,eθetinnen esa,eθetik,	I shall have rubbed.
Aon,eθetik,	I might have rubbed.

From whose second person, having taken away the augment, is made the imperative, mixed with the preterite *saθetik.*

The future affirmative, the first aorist, the imperative and the present of the personal mood, are allied tenses because they are of the same termination; as *e,aθet, a,eθet, á,eθet, seθet*; wherefore, from the future six others are thus derived, as the first aorist changes *e* into *a* short; but the personal mood into *a* long or *a* dipthong, resolvable into *ae* or *ai*.—But the imperative is formed from the second future or the first aorist by taking away the increment, and changing, for the most part, *ch* into *s*. Thus from *achieθet*, or, *e,hieθet*, is made *seθet*.

The future negative is twofold, the one which is the same as the perfect indicative; this is the negative before which is put the negative particle *stante*; as *stante ʁa,aketati*. The other, which is formed from the present, by taking the augment and adding some of the particles denoting emotion, namely, *nde, he, che, xe, se*, and *θe*; as *tae,eθe θande*—I will not rub; or rather, *te,eθe θande*.

But if the negative particles *te*, or *stante* be omitted, it will become the future of continuation, both in the indicative, as *e,eθeθande*, and in the imperative, *saθeθande*—continue to pound.

From this negative future is formed the personal negative mood by the addition of *nd*, or *nn* to the end of it, which is the same; as *te,eθeθa'ndend*.

All verbs want the participles, supines, and gerunds, which are thus supplied:

The infinitive supplies the place of—first, the past participle, as *achonde*—the thing happened; whence *,achondinnen, e,achondik*.

Secondly—It supplies sometimes the signification by the addition of the vowel *e*, or the syllable *ke*; as,

ˌAchiens tie,	In making a feast.
ˌAnnonchiˌe,	Whilst we were assembled.
Atrendaenke,	Whilst we were praying to God.

Thirdly—Supines are supplied by adding one of the particles of motion to the verb; as,

Aˌara θonʻθe,	I go to bed.
Aˌatsaθaionʻde,	I go to dine.
Aˌaketaθe, or, *aˌaketatihatie,*	I go to carry.

Fourthly—Supines in *u*, as *mirum dictu*, are supplied by the final particles *s* or *ti*, *r* or *k*, or *kʋi*, which signify quality; as, *aˌahʋat*—to gather for dressing; or, by the present infinitive itself; as,

Andorond'aketati, or, *d'aionkeʻtat,*	Difficult to carry.

Fifthly—The future participle passive as, *amandus*, is supplied by the relative with the personal mood as *asechiendaen*, *ahonachiendaen*, or by the addition of *ti*, *sti*, *kʋi*; as,

Honderaʻʋati,	Admired.

Sixthly—The preterite participle *amatus*, is supplied by the relative; as,

Honannonhʋe, or, *sennonhʋe,*	We love him.

When the French particle *que* comes between two verbs, it is thus expressed,

Iˌerheθoahaer,	I wish that he may do that,

in the place of thou mayst do that, as if it were, I wish your decision would do that, as the Italians say. But it is said

Isa iˌonnhas, iˌatonk saras kʋa,	I order you to depart.
Aˌonehien tsihon,	I command you to speak.

OF THE FORMATION OF TENSES.

Verbs whose infinitive ends in *a*, do not form their tenses in the same manner.

The following have the present in *a*, the imperfect in *ak*, the future in *en*, the future negative in *andi*; as,

Akwenra,	To say something.
ꞌAra,	To put upon.
ꞌArihwaꞌra,	To put upon a table, (i. e. a book).
Orꞌa,	To haft, to put an handle to.
Kannhontra,	To put end to end.

Of the Paradigma *ch.*

Kaꞌanꞌnra,	To look at.

Some relatives however, in *tra*, as *ꞌaatra*—to paint actively; *kaerontra*—to resemble, to represent actively. Relatives that have the future in *aren*, and the negative in *arꞌande*, *atꞌannontra* or *ennontra*—to follow any one, have the future in *tren*, the negative in *trande*; but *chierꞌa*—to be upon one's guard, of the paradigma *ch*, has the future in *raha*, or *rai*: the negative in *raꞌeꞌnk-ꞌaatra*, neuter to be present, to assist the future in *traha*, the negative in *trahei*; in like manner, *θoiꞌa*—I am as tall as that, and *ꞌanneateꞌntra*—to be lying, from *onnea*—a bone, and *atentra*—to be extended.

Akwa—to lie, is thus declined:

Present,	*Notawa,*	He lies,
Imperfect, Perfect, & Pluperfect,	*θoihokwak*	He has lain there.
Future,	*Ehokwa,*	
Negative,	*Stante hotaꞌnde*	He will not lie down.

Verbs in *e* have the following:—The present in *e*, the imperfect in *ek*, the future in *ei*, the negative in *eꞌeꞌenk.*

Haatate,	He is present there.
Hawendate,	His word is staked in it.

ʻArihʉate, That affair is comprised in it.
Onnhe, To be alive.
Honnonste, He is stingy.

Of the paradigma *s,* of the second conjugation.

Ondechate, There is a country.

Of the paradigma *ch,* of the fifth conjugation.

ʻAronhiate, There is a heaven.
ʻOntare, There is a lake.
ʻArhate, There is a forest.
Ioste, That weighs.

Of the paradigma *s,* of the second conjugation.

Hoti rastie, He is patient.

Of the second paradigma *s.*

ʻAʻenre, There is a scarcity.
ʻAstore, She makes haste.
Te orhatek, It is light.

The paradigma *s,* of the imperfect.

Orhaθeʻhak ʻatshenie, To burn the field.
Imperfect, *Eniehek.*
Future, *Enie.*
Negative, *Eniehe.*
Present, *Iek.*

Ohare,—To wash.

Imperfect, *Rehek.*
Future, *Rei.*
Negative, *Rende.*
Present, *Rek.*

Ekonnhek,—I help you.

Imperfect, *Hehek.*
Future, *He.*
Negative, *Hehe,* I forbid you.

ʻAʻaʁe,—To row.

Present, *ʁek.*
Imperfect, *ʁehek.*
Future, *Aʁe.*
Negative, *Ehe.*

Teorhaθe,—To be light.

Present, *θek.*
Imperfect, *θehek.*
Future, *θei.*

The following have only the present and imperfect in use:—*Hoʻete*—he carries; *tek* of the second paradigma *s*; *hotrihote*—he is attentive; *tek* of the first. *Oθorʻe*—it is cold; *ʁθorek*, of the paradigma *s*; *aʁenʻche*—the snow bears; *chek handare*—it remains, of the paradigma *ch, ek.* Other tenses are changed from *atrihotati*—to listen.—*Aθorate, enchate, endarate.*

The following have the present in *ech*, the imperfect in *eskʁa*, the future in *aʻe*, the negative in *eche.*

Atiaʻe,	To make water.
Tiaʻech anʻʁae,	To thresh corn.
ʻAnʻʁaech ahʁak,	To strike (i.e. with a hammer upon a nail.)
ʻAhʁaech eʻtarʻe,	To put fresh earth upon corn.
From *eta*—field, and *aʻe*—to push.	
ʻAtsistarʻe,	To stir the fire.
Aʻe,	To be awakened.

Stanteʻiech,

ʻIeskʁa, eʻiek, or *ehaek*, negative *aeʻch aʻe* when it is joined to the end of numeral words, is thus declined:

Tenditeʁentaʻe,	Two days.
Imperfect—*Teʁentaʻennen*,	He had two days.
Future—*Teʁentaek*,	Two days hence.

Achink, rsenta,ek,	Three days hence.
Achink e,aata,e,	Three moons.
Ndak i,a,onnha,e,	Four summers.
Sichihatonniene,	They are five in a canoe.
Asen ihatiata,e,	They are ten.

It must be remarked that some verbs of this termination have no perfect and pluperfect; but they take their perfect by putting the initial of the preterite.

Verbs ending in *i,* compounded of *i* signifying plenty have the following tenses—the present in *i,* the imperfect *in'nen,* the future *ik,* the negative *eche* or *chinidi*; as,

Annonchi,	Your hut is full.

Those ending in *ai* as *,achiai* and its compounds have the present in each; as,

Tehiaich,	I finish, I consume.
,Echia'ksa, echien, te,echiatae: also *annon'chichai,*	To make a hut.
And—*Ate iendichiai,*	To do properly.

Those ending *a'ndi, e'ndi, i'ndi, o'ndi,* with the long penult; form all their tenses almost in the same manner—namely, the present, in *as, es, is, oksa*—as

Annhandi,	To command.
Atenrandi,	To divide.
Katandi,	To be standing.
,Aesandi,	To be poor.
Chiarandi,	To recollect.

The future in *aha,* the negative *ache.*

Atentandi—to sleep, has the future in *ta,* the negative *tasache* or *stante hotandi* of the paradigma *s, senta*—sleep. —Thus:

Aa,endi,	To go out.
Andia,endi,	To escape.

ˌAatinˌendi, To go out of a place where one has been hid.

ˌAˌendi, To clean one's self.

Onnhonˌendi, To punish,

Have in the present, *ˌens,* the imperfect, *enskwa,* the future, *ˌenha,* the negative, *enche.*

Some have *enk* in the future, but not *ˌenha,* as;

Atehendi, To be ashamed.

Aterendi, To leave something by forgetfulness.

Of the paradigma *s; kwahendi*—to hate; of the paradigma *ch*; *ˌandiˌonrʿatoˌendi*—to know; of the paradigma *s; eiachendi*—to put one's self in a passion; of the paradigma *s*; *atˌaʿchia torendi*—to feel pain; of the paradigma *s;* has the present, *aʿechiatorka, torhak, toren, torande, andˌonrhendi*—to forget; of the paradigma *s;* has *henˌcˌhenk, henche, aienhwendi*—to know; *hwis, hw, cha, hwiche, ˌarindi,* to be spill't (it is spoken of liquor,) *ris riha, riche.*

Note.—When the speech is concerning an actual thing we say *ˌeienhwi,* but if concerning an habitual matter, or of many; we say *ˌeienhwis.*

The following have *k* instead of *ha* in the future;

ˌAnniainindi, To delay.

Ewaˌenniannik, I will delay, or, I will delay a long time, (i. e. to come.)

Of the paradigma *s, aerendi*—to be furnished.

EˌaerikˌThere will be enough.

It is said *hʿonnianni,* not *honneannis*—he delays; *hʿonnianninnen,* not *honnniannisksa*—he delayed; of the paradigma *s.*

Entondi—to increase; of the paradigma *s; tos, toha,*

toche, askondi—to fall into the water (it is spoken of an animated thing,) *skos, skoha, skocheondi,* (of an inanimate thing,) to fall into water. *Os oha, oche, anna, ondi*—the fish gives; *ˌannaos, naoha, naoche, aˌaˌondi*—to wear out one's self; *aˌons, aˌoncha, aˌonche.*

Those ending in *andi, endi, indi, ondi,* with the short penult, differ from the aforesaid, and for the most part are relative.

But all relatives in *andi* have the present *dik, dihik, dien, andihe,* thus *annondandi*—to wish, to love. The present, *nondandik*—I love; *stondandik*—thou lovest; the future *ennonnen,* the negative *stantennondandihe. Aθa'rá-tandi*—to oblige; the present *tandik,* the future *ten,* the negative *tandihe ˌaeskʉandi* of the paradigma *s,* the present *dik,* future, *kʉen*; *kʉandiche*—to laugh. *Oneskʉandi*—to be quite glad. *Kʉandek, kʉen, kʉaandihe.* But *endihendi*—to borrow from some one; future, *endehas,* have the rest as the former.

From these, however, are excepted those verbs which have one future in *indi,* with the short penult which are, for the most part, relatives. Thus—*ˌon'aˌindik*—I cut for you; *eˌon asen,* having changed *indi,* of the infinitive into *sen.*

Aierihndi,	To satisfy any one.
Eskierisen,	You will satisfy me.
Ontrahʉendi,	To put something in a bag for some one.
Eskontrasen,	You will put for me.
Ennonhʉendi,	To be hurried, to be in haste.

Though it be not relative, it has *eʉaˌennon sen* of the paradigma *s. Endeshʉindi,* relative, to communicate his sickness to any one, has *eskendeohas*—you will infect me

with your sickness.

The relative *in ondi* has for the most part the future in *onhons*, the rest as the relative in *andi, endi, indi.* Thus *ahiatondi*—to write for any one; *e,onhiatonhons*—*atendotondi* is excepted; it has however, in the future, *e,onatendoton. Onde*—to finish, present, *ondech*, future, *on'dei*, negative *on'de'che. Ondi*—to do, and its compounds have *onniak, onniahak*, future, *onnia*, negative, *oniande*—Thus *achondi*, to accomodate of the paradigma *ch*—*ksatronhiondi*—to quarrel with any; of the paradigma *ch*, *aterennondi*—to do properly, of paradigma *ch*. Its terminations in *gi'a,i*—to eat; present *i,ech, i,eskɔa, e,ei*, negative, *stante,exe.*—*,Arihɔanderai*—to fish; *rach, rai, raxe. Annona,i*—to have a desire to eat any thing. *Askarahɔa,i*—to broom. *Enda'tiai*—to eat to excess; *,aa,i*—to break, to cut: *At,a,rii*—to overturn, present, *r'is*, future, *r'ik.* And *,ennoni*—to go to seek, present, *nonch*, future, *noni*, negative, *nonche.*

Verbs in *senni* as well relative as absolute form the future by taking away *enni*, of the infinitive as, *eiachisenni*—to hate any one; *eskeiachias*—thou wilt hate me. The others as verbs in *andi, endi, &c.* with the short penult, in present, *ik*, imperfect, *chik*, future negative, *ihe.*

From *asensenni*—to fall to any one, of the paradigma *s*.

A,asensenni,	That is fallen to me.
Eɔa,asens,	That will fall to me.

Verbs in *ri onder'i*—a thing secured, and its compounds, as, *horihɔan'diri*—a thing secured; future *eorihɔa'ndirha*, negative *stanté orihɔandiche. Ori*—to be perplexed, and its compounds, have the present in *oiak*, or *oïes*, the imperfect in *oiahak*, the future in *oia*, the negative in *oia'nde*; thus,

Annonhɔarori,	To sing his death song.

ˌAnʿʁorʿi,	To stu *la sagamité.*
Atori,	To hunt, to start game.
Atontarori,	The lake is agitated.
ˌEntenri,	To have pity.

Present, *xetenrha*—I have pity on people; future, *exetenr;* negative, *tenraʿnde.*

Enri—to leave, omitting the paradigma *s;* present *enrha,* future *enr,* negative *tenranʿde.* Thus the compound *ˌarihʁenri*—to omit any thing.

Verbs ending in *ste, ti, tsi*—*Arihʁiosti*—to believe, to think, to esteem; *chrihʁiosθa*—thou believest; future, *echrihʁiost;* negative, *techrihʁioʿstaʿnde.* *ˌAsti*—to serve one's self with something, of the paradigma *ch*—to deliver some one, to do or suffer for him.

What the Hurons call *ˌaskorasti,* has the present *rasθa;* future, *rast;* negative, *rastanʿde.*

Asti has in the present, *ihasθa*—he serves himself with it; in the future, *ehast*—he will serve himself with it; in the negative, *stantʿe hastanʿde.*

Atestenti—to descend; *chiatestenθa,* future, *echiatestent;* negative, *teˌhiatestentanʿde.*

Endaon nénti—to descend the river, of the paradigma *ch. θaereda onnent, nentanʿde, ˌaˌondaʿti*—to augment; *chièˌondaθa,* the future, gives the negative, *daʿtanʿde ate ˌati*—to light fire, of the paradigma *ch. Aʾθa, at, atanʿde,* and so all the compounds, from *ti* final, signifying quality.

But verbs whose *ti* final does not signify quality, and whose penult is short, form their tenses thus; *as, at, aθe;* thus:

Aθorati,	To be cold, of the paradigma *s.*
Atrihotati,	To listen, of the paradigma *ch.*
ˌAndasati,	To dig, of the paradigma *ch.*
Atsenti,	To dress a wound, to give physic

ꞌAeriti,	To finish, to accomplish, of the paradigma *ch.*
Kʉatonti,	To put themselves together, of the paradigma *ch.*
Tehontons,	They are together, that is, at the same dish.
Skannonti	To miss his aim, it always reduplicates.
Onsahannont,	He has missed his aim.
Stante saꞌeʉendannons,	None of my words have escaped him, he hears all.
Endarati,	To inhabit, of the paradigma *ch.*
Ochate,	The winter comes, of the paradigma *ch.*
Onnhonti,	To give life.
ꞌAndiatensti,	To call.
Chiendatens,	You call him.

the future, *echiendiatens;* negative, *techiendiatenseᶜ.* So *onatsi*—to gather; present, *chionas*—thou gatherest; future, *echionas;* negative, *onaseᶜ. Atati*—to speak; *tiak, tia, tiande.*

Verbs in *hʉi, ʉi, kʉi,* and *xʉi,* and terminating in *hʉi,* have *ach, ak, ashe;* as,

Oᶜtrahʉi,	To travel over, *oᶜtrach, otrak, otrahʉe,*
ꞌArihoᶜtrahʉi,	To repeat a prayer.
ꞌAnnontrahʉi,	To bury.
ꞌAnnenchonhʉi,	To cover something, that is, a trunk.
Askétrahʉi,	To paint, or make of different colours, as a gown.

A,aenhsi, To put some utensil out, as, of a hut.

(but *,a,aendi*—to go out, is called neuter, and follows verbs in *endi*, with the long penult), *,aatin,enhsi*—to put a man out of the hut; (*,aatin,endi*—to go out, neuter, and follows verbs in *endi*, with the long penult.)

Atitrahsi, To put one's self in a canoe, of the paradigma *ch.*

Asohsi, To stain something, of the paradigma *ch.*

A'tonrohsi, To plunge.

Verbs ending in *asi*, have *ach*, future; negative, *ashe*, —thus: *,Achiendiasi*—to disdain. *Chiechiendiach*, future, *endia*, &c.

'Okasi—to spoil any thing; *chiokach;* future, *echi'oka;* negative, *ashe.*

Ate'rakasi—to mark, to draw, of the paradigma *ch.*— But *,ondasi*—to fish, of the paradigma *s. Andasi*—I have fished, future *esandasi*—I will fish. *Ksi*, final signifying quality, *,andero'nksi*—to value, *storonksa*—thou valuest; future, *estoro'nksa*, negative, *testoro'nksan'de. Xse* final, has present *xsach*, future, *xsa*, negative, *xsache*, thus;

,Aenxsi, To make or to have fields.

,Annhonxsi, To put in the mouth.

,Askonxsi, To put in the fire.

Ksatoxsi, The sun sets.

Ksasenxsi, To cry.

Verbs ending in *o; ,aio* for *,ario*—to strike, to wound, present, *rios;* imperfect, *riosksa;* future, *rio;* negative, *rioche.* Sometimes and oftner *riohe* in the second person, *chr,aro* for *,arao*—to fell, to prepare wood; *raoch, raosksa,*

rao, raoche; the second person *chao;* the third *karoch*—to spring; *ˌa'ndio,* to grow; *dios, dioskɐa, ndiok, ndioche. Iˌo*—there is something liquid, imperfect *ˌiok*—there was, *eˌoha*—there will be (that is water,) signifying also, he will fall (that is into the water,) vide *ˌondi*—to fall into water, concerning an inanimate object, as though it were *oondi*—to distinguish, *ˌondi*—to do. *ˌAndio*—to pass somebody in a canoe. It is always joined to the verb of motion *hon*, in this manner, *ˌandiokon*—to go and pass some one in a canoe, present *he;* imperfect *henn;* future *ha;* negative *hese'. ˌAɐendio*—to be master, is thus declined, *stanchieɐandioteˌen*—thou art not master. *Stanchieɐendioteˌen'nen;* future, *isɑchieɐendioeˌenk,* or *eɐaton;* negative *te'ɐaton'de.*

Verbs ending in *ɐan* are pronounced as if they were *ɐen.* Those verbs in *an* have *ach* or *as,* future *a,* negative *ahe.* Thus, *ˌa'x'ɐan*—to steal, to plunder, of the paradigma *ch, xɐach, xɐa;* negative *xɐache. Askoɐan,* of the paradigma *ch*—to draw a man or an animal out of the water, *ˌan'nraɐan,* of the paradigma *ch*—to dance, *nraɐasn'raɐa, 'nraɐache. Astakɐan*—to promise, of the paradigma *ch;* present *kɐas. Entaɐan*—to pass a day, of the paradigma *ch;* present, *taɐas.* Except *kakɐan*—to lift up, future *teˌek*—I will lift up, not, *teekɐa;* negative *kɐan'de.* In like manner *askaɐan*—to chew, *chiaskaɐhas;* future *echiaska;* negative *t'esaskaɐan,* or *t'echias kaohande,* but this is less in use.

Verbs ending in *'en, ien, ennen, &c.*

Verbs in *en* have the present in *xa,* the negative in *ande.* Thus *ar'onˌen*—to listen, paradigma *ch; ar'onxa, eˌaroni*—they will hear; negative, *stanteˌar'onˌande, ateˌen*—to burn, to have fire, of the paradigma *s;* present, *ɐteixa*—there is fire; future, *ɐtei;* negative *t'eoteˌan'de. Atroˌen*—to make love, of the paradigma *ch; atroxa,* future, *troi;*

negative, *te,atro,an'de.* *,Ato,en*—to perceive, of the paradigma *ch*; *etoxa*, future, *e,etoi*; negative, *o,an'de.* *,Andáen*—to sow, of the paradigma *ch*, *indaxa*—I sow; future, *endai*, negative, *stantenda,an'de.* But *o,en*—to make water, (it is spoken of a canoe) is excepted present, *i,o,as*—it makes water; future, *,eoxa*; negative, *stante,o,áche*—*,En*—to be made, or to become, is put after some words which cannot be conjugated. Thus, *chie,indiote,ien*—thou art not master. *Stan,arihsate,ennen*—it was not a thing of consequence; future, *,arihsae ,enk*, or *esaton*—that will become an affair, or, it will be a subject of quarrel; negative, *stan,arihsa tesatonde*—that will not be, or will not become a subject of dispute. *Endie,sendio áioton'nen*, or, *áen'nen*—I would have been master of it; *,aen*—to be, of the paradigma *ch*; *e,aen*—there is; imperfect, *,aentak* there was; future, *ea,entai*—there will be; negative, *stante,aentaie,enk*—there will not be. And thus in composition, *andahiaen*—there is a knife; *,andahiaentak*; future, *e,andahiaentai.* Some compounds from *aen*, add *t* to the infinitive; as, *atrendaent*—to pray to God; for *atrendaen*, *atrendaenhak*, from the present, *,atrendaenk.*

Perfect, *A,atrendaen.*
Pluperfect, *Aatrendaentak.*
Future, *E,atrendaen.*
Negative. *Te,atrendaende.*

It is thus said *atient*—to sit, for *atien*, and *,ahaehent*—to hold a council, for *,achachen*, they form their tenses as *atrendaent*. *,Aarihen*—to be better, of the paradigma *s*, *a,ierih a'ch*; future *esa,ienk*; negative *t'esa,ieriha'se.* *Ohiahen*—to split wood, of the paradigma *ch*, *ohiahas.* *Ohsichatihen*, of the second conjugation of the paradigma *s*—she is feeble; imperfect *hennen*; future *eohsi chatihenk*; negative *t'eohsi*

chatiha'se. *¸An'nien*—to bark, of the paradigma *ch*, *i¸an'diatk*—the dog barks, future *e¸andia*; negative *té¸andian'de.* *Ataien*—to smoke, of the paradigma *ch. etaiak*—I smoke, future *e¸etaia*; negative *te¸etaian'de.* But *a¸aien*—to eat, of the paradigma *ch*, present *ias;* future *ia*; negative *iahe*; is only in use when compounded. *¸Andatara¸aien*—to eatbead, present *'ndatara¸aias*; future *endataraaia*; negative *t'endatara¸aiahe.* *Acha¸ennen*—to quarrel about an ax, to fight who will have it, of the paradigma *ch*, present *¸acha¸ennha*; future *e¸acha¸enn*; negative *stanté¸acha¸enna'nde.* *Akʂa¸annen*—to speak a foreign language, of the paradigma *ch* present, *akʂa¸annha* future, *e¸akʂa¸ann*; negative *te¸akʂa¸anna'nde.* *Asa¸annen*, of the paradigma *ch* to speak, to pronounce in the manner of strangers; *¸asa¸annha*; future, *i¸asa¸ann.* *Atiatoxʂannen*—to swallow an animal, of the paradigma *ch*, present *xʂannha*, *¸a¸andennen* of the paradigma *s* in composition as *aonde'cha, andennen*—the earth trembled, present *¸andennha*; future *eaondecha, andenn, t'eaonde'cha, andenna'nde ¸aeren*—to make, *ierha*—I make, *e¸ier*—I shall make, *t'e¸iarande*—I shall not make. *¸Aatannen*—to be delicate, of the paradigma *ch*; present *¸iatannen, ¸iatannennen*—I was delicate, future *chaatannenk.* *¸Annr'en*—to bind, of the paradigma *ch*; present *¸ennren*, imperfect *¸onnrennen, e¸enrenn*—I shall bind, negative *te¸en'n'renche.* *Orannonen*—that is wet, imperfect *orannonennen* that was wet; future, *eorannonenk*, only, *osen*—to dress a skin, of the paradigma *ch*; present, *os*; future, *os*; negative, *Stant'eʂa¸osen*, or, *te¸ose.* *Atonsen*—to thank, of the paradigma *ch*; present, *¸atones*; future, *e¸atones*; negative, *te¸atonese, or t'eʂa¸atonesen.* *Kaxen*—to be double; *tehixen*—they are double; *tehixen'nen*, in composition, as, *kandehʂaxen*—to join two skins together, of the paradigma

ch; tendehsaxas—I join; *tendehsaxa*—I shall join.—*Stantatendehsaxa'se*—I shall not join. *,An'dotan*—to relate; relative, present, perfect, pluperfect, *tonk, ton* —I will relate; *ton'de*—I will not relate. Thus, *,ahiaton*—to write; *atsaron*, to cry; *aronton*—to interrogate, all of the paradigma *ch.* But *aton*—to be possible, preterite *ononnen. Anon*—to enter; *onk*—I enter; *on*—I have entered both of the paradigma *ch. Aton*—to be lost, of the paradigma *ch; stantesa'tonk* this does not perish; *,andoron*—to be of importance; present, *ron*; imperfect, *ronk. ,Aendaon*—to receive; *iendaons*—I receive, I take; *aon*—I will take; *on'de*—I will not take, both of the paradigma *ch.*—Those change *on* into *a*, for the future which follow:—*,aenchon*—to flay, of the paradigma *ch*; present, *chons*; future, *cha*; negative, *chonhe.* Thus the following—*ahsichennion, ka,ennion*, both of the paradigma *ch*; *,aarennion* turned away, of the paradigma *ch*; *,aten'taron*—to hang out for sale, of the paradigma *ch*; future, *tentra*, for *tentara*; *sskaton*—to detach, to pull; *sskra*, for *sska,ra*; *onharon*—to weed, paradigma *ch*; future, *onhra*, for *onhara. Kandi,onkennion*—to deceive, paradigma *ch*; *ksendi,on'te,aron*—to have wit, paradigma *ch*; future, *on'te,ra*, for *onte,ara*; ex:—

Ate,endi,cntera,	I shall have a frank mind.
Ksenton,	To go and return in a day, paradigma *ch.*
Ate,enta,	I shall return today (said I in parting.)
Kaentaton,	To bend a stick.
Te,ienta'a,	I shall bend.

Ennion—to pass, has *endi* in the future.—Thus:—

ˌAtennion,	To change, paradigma *ch.*
Setendi,	Change, turn the dish,
Enditennion,	To blame, paradigma *ch.*
Enheon,	To die, paradigma *ch.*

Future *eˌihei;* negative *tʻeˌiheonʻehe. Ation*—to quit, to throw, of the paradigma *s*, is irregular, present *aˌaties*—I quit, future *esaˌati*; negative *tʻesaˌatiʻse*; and is similarly compounded with *ontion, as ˌaatontion*—to abandon any one.

The relative *on* in verbs of motion in which there is a double present, the one in *e*, as. when one is actually going on a journey, or at the end of it; the other in *es* to signify custom and habit; whence the imperfect is also two fold, the one in *enn* answering to the present in *e*, and the other in *eskɐa* answering to the present in *es*.

Verbs of motion, (as for the most, in the *aorist*,) differ from the termination of the future affirmative, and have *e* not *a*, as, *ahatrendaeʻnde*—he goes to pray to God, when either he is on the road or at least is in readiness for the journey.—*Atrendaennen*, present—*ˌatrendaende*—I come to pray to God, or I arrive at the place where I ought to pray to God; or, *ˌatrendaenʻde*—I go habitually to pray to God, or, I am accustomed to go to pray to God, imperfect *daʻendennt*, or, *daeskɐa;* future *eˌatrendaenʻda;* negative, *eˌatrendaeʻndeʻse ˌanʻnotration*—to follow some one. Relative, present *traties;* future *tratia;* negative *tratieʻse. Atannon*—to go to bed, paradigma *s. Tandes* or *tanʻde*, negative *tandese. Kɐatenʻdaɐachou*—to go to hunt, of paradigma *ch; endiachion*—to borrow, of the paradigma *ch. ˌEnnonchion*—to go and fetch some one. Relative, *ˌenronnon*—to go to take any one. Relative from *ˌentron*. The following differ in the future affirmative as *ahenton*—to go before, of

the paradigma *ch*; future *e,ehent*. *Annionnon*—to take; future *e,enniomn; ,annentraienton*—to go along the edge of the water, of the paradigma *ch*; future *traient*. *Askwinnon*—to cover, future *ehaskwindet*. *I,'er*—It is the sun, imperfect *i,arak*; future *e,arai*. *,Arihwar*—that is the thing, imperfect *,arihwarak;* future *e,arihwarai*. *Ka,akarent*—to have two eyes, of the paradigma *ch; te,e,a'karent*—my two eyes, imperfect *,te,ea'kar'entak;* future *t'e,a'kar'euten*. Negative, *stanta'te,e,aka'rent a'nde*. *,Eskarent*--my mouth, *eskarentak e,eskarenten, t'e,eska'renta'nde, ,ehekarent*—my bottom, *,eheka'rentak*; future *e,ehekaren'ten &c*. *Askont*—to be roasted, of the paradigma *ch;* perfect *,askont*—that is roasted; *e,askontaha*—that will be roasted; negative *tache*. *At sesta,e aontaha*—that has just fallen into the fire; but it is said *hoskontandi*—it is burnt; *,aatont*—to be bound, to be a captive, of the paradigma *ch*; *haatont*—he is bound, *eha'atontaha*—he will fall into snares; negative *tehaatontache*, but it is said *haatontandi*—he has fallen, &c.

When these and like verbs are taken actively, as *,andiont* or *,a'akont*—to suspend in the air any thing, they have in the future *,ehaatonten*—he will bend him, *ehaaskonten*—he will roast the eel, as *ehandionten* or *ehaa'konten*—he will suspend that above; and then in the preterite it is not said *hoskontandi, hoatontandi*, but *hoskontak, hoatontak*—he has or he had roasted it. *A,endi,ont*—I have spirit, paradigma *s;* imperfect *a,endi,ontak;* future *esa,endi,ontaha tesa,endi,ontache*, but it is said *a,endi,ontandi*—sense came to me.

Neuter, *,annont*—to be in the sepulchre, paradigma *ch;* present *ihannont*; imperfect *annonlak;* future *annontai;* negative *nontache, anhont;* neuter—to have something in his mouth, *hondatarannhont*—he has bread in his mouth,

hondatarannhontatie—he goes carrying bread in his mouth. But *ꞌannontandi*—to make good cheer; future *hontache*, paradigma *s*. Negative, *stanteʻʁaꞌeꞌannhontache*. *Atiront*—to draw something, paradigma *ch*; present, *hatiront*, or *hatirontha*.

Ɪsat—there is something inside; *ɪsatak*—there was; the other tenses are not in use, thus: *onneat*—there are bones there inside; *onneatak*. *Hondïat*—he has set an osier fish net; *hondïatak*. *Hakonʻchiat*—he holds it before; *hakonchiatak*. *ꞌAꞌenrat*—that is white; *iꞌaꞌenratak*; future, *eꞌaꞌenrataha*—that will whiten; negative, *stanteꞌaꞌren raiachei*.

Atsat—to show; active, paradigma *ch*; *ihoʻtsat*—he shows now; *ethatsata*—he is accustomed to show; future, *ehatsaten*; negative, *tʻehaʻtsatanʻde*.

Endakʁandet—to commit fornication, paradigma *ch*; the active present is twofold, namely, *ondakʁandet*—he is in the flagrant sin of fornication, and *endakʁandeha*—he is wont to commit fornication. *Akʁant*—to embark pacquets, actively of the paradigma ch; *haʻkʁariha*; future, *ehaʻkʁariten*; negative, *tʻehakʁaritanʻde*.

Atit—to embark one's self, passive of the paradigma *ch*; present, *ihotit*, or, *hatiha*, but it has a double imperfect; *hotitak*—he was now embarked; *hatitak*, habitually.—*ꞌAentʁt*—to have a stick there, or, to fix a stick in the ground, like the former signification, it is said *ꞌaentʁtak*, future, *eꞌaentʁtaha*—the stick will stick in (i. e. in falling;) future of continuation, *eʻaentʁtai*; negative, *teꞌaentʁtache*. The neuter, like the last signification, is said *haentʁha*—he plants; *tʁhak*, future, *tʁten*; negative, *tʁtanʻde*.—*Ateiaʻchiʁt*—to be in trouble, (i. e. about absent persons), neuter, of the paradigma *ch*, *aꞌateiaʻchiʁt*, or, *ꞌateiaʻhiʁha*,

chisθak; future, *e,atnia'chisten;* negative, *chistan'de.*

Atiatst—to be sentry, of the paradigma *ch*; thus: *onnenhst*—there is corn formed in the ear; future, *e,annen hsten;* negative, *tan'de,* has *θa* in the present.

In many verbs the actual action is expressed by the preterite, and the action as if habitual by the present; as, he is now cooking, *ho,annon.* Habitually, or, his office is to cook, *a,annion.* He dines, *hotsataion.* It is not his dinner hour, or, he is not accustomed to dine at this hour *stanthatsa taionk xa,en'de.*

Note.—The termination of the future negative in *ehe,* is written by the larger *k,* and the penult is either long or aspirate, as, *stante stonseche*—thou wilt not love me. *Stantoesa,onnhéche*—I shall not be ignorant of that. The termination of the same future in *se,* is always aspirated, as, *stante,ese'*—I will not go.

Rules common to all the Verbs.

From the present indicative ending in *a, e,* or *o,* is formed the imperfect by adding *k,* as,

θoi'i,erha—I speak or I act in that manner.	Imperfect *θoi'i,erhak.*
A,e,ete—I carry,	*a,e,etek.*
I,onnhe—I laugh,	*i,onnhek.*
Haatate—he is there,	*haatatek.*

Except words which are joined to numerals, as, *tendite,senta,e,*—two days; *tesenta e,nne'n*—it was two days ago; *achink i,arihsa,e,*—there are three things; *achink i,arihsa,ennen*—there were three things; *achink itson,* or, *itsonn'en*—they are, or, they were all three together.

Achink ia,ion—there are three of us, they two and I, &c. *'a,ion, ition, itson, ndak ihonsen*—they are forty—*ihonsennen. Tendi atesendiase*—there are two hundred, *ten-*

diate ʉendiaʉennen; I,o—there is some liquor, imperfect *i,ok.* *'Aronto*—there is a tree in the water, imperfect *a'rontok.*

When the present tenses end in *i*, the imperfect is formed by adding *innen*, as *,ientenri ,iennentenrinnen*—I know, I knew; *,einhʉi*—I am skilled in; *,einhʉinne'n, ondiri*—that is strong; *o'ndirinne'n. Tendi*—they are two; *tendinnen* —they were two. Thus certain infinitives, which are used to signify the third person passive, as, *,ae'hondi*—that is done, or, prepared; *ae'hondi, ,ac'hondinne'n. Stanθote ,aeren*—that is not done thus; imperfect *,aerenn'en ont ,arihondi*—that is a story; imperfect *,arihondi ehan*—it was in vain.

From the present in *ak, ek, enk, ik, onk*, the imperfect is formed by inserting *ha' he, hi, hon*, before *k, as hae'honniak*—he prepares; *hae'honniahak, ha'trendaenk*—he prays God; *hatrardaenhak, hatsiheniek*—he burns the earth; *hatsiheniehak, haʉennonhʉindik*—he has hurried.—The paradigma of the third conjugation is *s, haʉennonhʉindehik, hatiatonk*—he writes; *hahiatonhonk.* The termination of the present in *ch* or *s*, is changed for the imperfect into *shʉa,* as *,haraskʉach*—he is going away; *haraskʉaskʉa, ,aketas*—I carry; *,ake'taskʉa.* From the present in *t* is formed the imperfect by adding *ak, iʉat*—there is something in it; *iʉ'atak, haatont*—he is a captive; *haatontah, haatet*—he is in a canoe; *haatitak.*

From the imperfect ending in *k* is formed the future of continuance by changing *k* into the minor *g*, *,eθeθak*—I bruised; *e,eθeθai*—I shall continue to bruise or break.—*Chiehiatonhonk*—you wrote; *sehiatonhoni*—come write on; *e,chonniahak*—I arranged; *e,echonuiahai*—I shall continue to arrange, i. e. to-day; to-morrow when spoken thus, *e,eθat*—I will break; it is then understood to mean at one

time. But when one speaks *e,eθai*, it is then understood of many times.

From the imperfect termination in *skʁa*, is formed the future of continuance in *ska*, *ha'chiaskʁa*—he consumed; *eha'chias'ka*. That which is in French spoken thus, j'ai pensé il ne s'en est guères fallu, j'ai près que, on, j'ai été sur le point de faire, de dire, &c., is by the Hurons thus spoken in the present indicative, by adding *ska*, *a,iheonska*—I thought of dying; *achikeonoka*—you thought of dying; *ʁhaota,onnioska*—I thought I was spoiling the whole; *a,itaraska*—I thought I was falling. And when one replies to any thing distant and past they use the pluperfect of the personal mood, as, *aon,iheon'nen*, or *tioskehensehen d'aon,ihionn'en*—I was near dying of it.

When the negative future is unknown, then the perfect is to be used with the negative particle, *stante* placed before. Moreover the preterite and praeter pluperfect have the same termination as the future. *Stante'koraskʁache*, or *stantehoraskʁan*—he will not go.

The negative personal mood is formed from the future negative, *stante haraskʁahenn*—he would not go, thus by adding *nn* to the future; *stante haraskʁahe*. There is another tense which is expressed by these words, I go doing, I go speaking, and is the same as the future negative, omitting the negative particle, *stante, haraskʁahe*—he goes walking, he continues to walk; *hahiatonde*—he goes writing; *sehiatonde*—you have continued to write. When a continued action is joined to motion, it is expressed by *hatie* or *tie* added to the final syllable of the infinitive, as; *hotrendaentatie*—he continues his prayers walking; imperfect *hotrendaentatien*; perfect *hotrendaentation*; pluperfect *hatrendaentationn'en*; future *ehotrendaentatia*;

negative *stante hotrendaentatiese,* or *tehotrendaantation.*—Thus *shotierontie*—he is returning having taken some of the enemy, imperfect *shotierontienn, &c. hohatitatie*—he is going to take it in a canoe; *a,iheonhatie*—I come nearly dead; *a,a'kero'ndihatie*—I come in great fear. But these verbs are always of the paradigma *s,* a few excepted.

Verbs whose infinitives end *t,* as *,ahachent, atrendaent, ,aatont,andiont, ,akont,* take *hatie.* Verbs ending in *on* take the augment *tie,* as *,ahiaton, atendoton,* except *hasenheonhatie, ihennonhatie.* But with verbs of motion there is subjoined, *ontie,* as *,aentontie*—the stick goes; *arihontie*—the discourse continues; the others add *hatie.*—Thus one says *hatiseihatie*—they always go together, and *achinkihennonhatie*—they three go in company, when one would speak of a single act; but if repeated acts are intended then they would be expressed thus, *hatiseihaties, hatiseihateiskwa, ehatiseihatieska, &c.*—which is also in use with certain verbs of motion, as, *,atrendaendes*—I am used to go and pray to God, I go every day to pray to God; but *,atrendaende*—I come to pray to God; is understood of only once. This additional letter *s* not only signifies frequency of action, but also plurality, as, *hatirihsannens*—they are great; *hatindachiaθens*—they are thirsty; *hatindacheannens*—they are delicate, and if used in the singular, *harihsannen, handachiathen, handachihsannen, haatannen,* thus, *θoegan datsasasate*—these kettles are all of that size; *θoi,andnsha* the kettle is like that. That which amoung the Latins is expressed by these words, imminet, impendet, mihi periculum mortis impendet, vel alterius; is expressed by particles of locality joined to the future negative, the particle negative *stante* been omitted. *Onta,iheonche*—death hangs over me; *onta,onriohe*—I foresee, I have a

presentiment that they will kill me, thus in a favorable signification, *ontaxeiohenonse*—I foresee that I shall do much in battle, that I shall kill men; *hatitoxak' hotiatato-ꞌetjesꝰs onse etho tonhatien*—the Prophets foresaw well that Jesus would be incarnate. But these verbs are conjugated like the other verbs of motion with the particles *t, ont, &c.* Thus you would say, *stante ꞌkiheonche*—death does not yet threaten me, and thus, *ehiheonchen*—death was then threatening me, also, *heonchenn.* Many verbs which are used to express as well the place, or the business, as the act, are placed in the present tense when they designate the place or business, but in the perfect when they mean the action, *v. g. hatrendaenk*—he is accustomed to pray to God, he professes to do so; *hatrendaenhak*

Present.		Imperfect.
Hatsationk entiek Onnaꞌꝰatren.	He eats or dines usually about noon, when he goes away.	*hatsationhonk.*

Haꞌannꞌionk—he is a cook—*haꞌannionhonte,*

Stante hahachenk { he is not a Priest, he does not say Mass. } *stante hahaꞌchenhak.*

Hotrendaen—he is at prayer now, *hotrendaentak.*

Pluperfect.

Hotsitaion—he is dining { *hotsataionk*—he was dining.

Hoꞌanꞌnion—he is now cooking or boiling the kettle. { *hoꞌanꞌnionk.*

Hohaehen—he is saying Mass now, { *hahaꞌentak*—he was saying Mass.

The contrary however, is done in some verbs, as, *aihꝰistadexa*—I believe that fact; imperfect *rihꝰistak, ꞌarihꝰiosti*—I am faithful, and *xienstannondete, akꝰas*—I do not cover myself from that; *ondeaꞌakꝰatsi*—I am covered

from that. Some verbs have a double future, one proximate, the other more remote—*v. g.*—If I am near the end of my life I have no more need of medicine—*dɛsa'atonhatai, t'eskasaonkɛichias,* this is an example of the proximate future of the paradigma *s.* When I am at the end of my life I shall repent of having sinned, *eskɛa,endi,enratakɛa d'arihɛandera,ide, atonhaten. I* is prefixed to certain words as *i,e*—I go; *i,atonk*—I say; *iondɛs*—it rains.—To some words *nno* is prefixed as to those before mentioned, to others at the pleasure of the speaker, as one says, *hatoxa* —he sees; or *ihatoxa.* It is prefixed to the first and second persons of the irregular verbs of the second conjugation in *are* as *indare, istare, handare*—I remain, you remain, he remains, unless it takes before it the augment, *a.* or *e.* or the marks of relation, *,aha, ,aehae, he, xe, &c.* in one word. It is always lost after *ie, θe, xe, axi,* and other like marks of relation; also after the augments *a, ai, e.* But it is prefixed to the particles reduplicative, and to greater binary numerals, unless motion be expressed, *v. g.* one says, *tendite skare, achnick, ih,enha, ekndak, iskɛatare*—to three years, add four months or moons, it is three years and four months since. But one would say, *shondennion* or *skatshondenhion*—it is a year ago. *Tendite, skondennion*—it is two years ago; *achinck, eshondennion*—it is three years ago. *E.* not *i.* (by reason of the motion, which is signified by the word *,andannion*—to wait, or *ketch,* which is joined to the reduplicative,) signifies, to be a year ago. But if you prefix to the latter also any other numbers it will have the same signification as above—it is always placed after *ɛseti,* as, *ɛsetiihato xai*—he sees all things.

OF THE CONJUGATIONS OF THE SIMPLE VERBS.

Of the personal mood—1st Conjugation.

NOTE 1.—*T'á,aketaska*—why should I carry it? has the same initials as the present affirmative of the personal mood, *a,apetat*, and is taken for the negative future of the indicative mood, *apetaθe*.

NOTE 2.—In the present affirmative of the personal mood, the augment either not pure or followed by s is taken away, as if it had been a dipthong remaining from the letters *ai* or *ae* and therefore it is marked with a circumflex, as *á,ahetat*.

NOTE 3.—After *θe, ti, chi*. *A* and *E* which are marks of the aorist and future affirmative, the particle s is to be inserted.

1o.—Before the first person singular of the paradigma *s* in all the conjugations, except the personal mood.

2o.—In the third person singular feminine of the paradigma *chi*, of the 1st and 3d conjugations.

3o.—In the third person plural, feminine of the 2d, 3d, 4th and 5th conjugations of the paradigma *chi*, except the third person of the verbs beginning *enn* and *end*, of the 3d conjugation, which have *,on*.

4o.—The personal mood is often increased, by removing the augment, as if it was the mark of the imperative, as, *ksatrendaen*—let us pray God, for *aksatrendaen*.

5o.—The personal mood of continuation is generally expressed thus, *aon, ake'tati kich*—I would still continue to carry, or, *aon' ake'tati, hatieska, oesaketati hatieska*, &c.—But for the negative mood of continuance we say, *aesakasank otesake'tati hatiend*—you should have ceased to carry, or, you ought not to have continued to carry.

6o.—When the French I had, or, might have, can be

expressed by—I could, would, or should have, the personal mood is used, *v. g.* I might have kneaded, if you had not stopped me. *Aon, eθetin'nen onta te skenda ueshandinn'en;* but when it cannot be expressed by I could, would, or should have, the pluperfect of the indicative or subjunctive is made use of, as, if I had kneaded, I should have made some bread,—*aondaθarontak θe ua,eθetin'nen.*

7o.—From the imperfect of the indicative is formed another tense of the personal mood by prefixing to it the marks of the personal mood *á, ae, ai, &c. v. g. aontahonnhek asonahonhek*—he would be still here; *a,entak*—that will be there.

8o.—Two tenses of the personal mood, which are in use in affirmative propositions, in negatives are never known, but in their place is used the negative personal mood, v. g. *Te,eθetandenn*—I should not beat, or, I should not have beaten; although one might say *a,eθet,et anou,eθetin'nen*—I would beat, or, I might beat.

Of the Imperative Mood.

The imperative, properly speaking, is formed from the second person singular of the future affirmative by taking *s* in the place of the characteristic *chi*, without prefixing *e*, as,

Imperative,		2d per. sing. fut. affirm.
Seθet—pound ye,	from	*eehi eθet.*
Saraskua—go ye away,		*echiaraskua.*

If *i* follows *s*, then *t* is to be prefixed to *s*, as *tsihon*—say ye, from *echihon*—you will say. If after *s*, *i* short and pure is found, it is lost, as, *tsaanha*——go ye out, from *echia,enha; tson*—come in, from *echion*; *tsen*—place, put ye, from *echien*—you will put or place.

Verbs of the paradigma *s*, also irregulars of the second

conjugation, beginning with *ˌand*, *ˌann*, and *ar*, have no difference between the second person singular of the future affirmative, and the second person singular of the imperative, except that they lose the mark *e*, of the future, as *sakeiˈouha*—fear ye, from *esakeiˈouha*—you will fear; *sta θara*—examine ye, from *estaθara*—you will examine; *chiehsanderai*—sin ye, from e*chihsanderai*—you will sin.—

The second person dual and plural is formed from the second dual, by taking the mark of the future *e*, as, *tsiθet*—strike ye, from *etsiθet*; *stehiarˈaha*—remember ye, from *estehiaˈraha*. When one speaks of two, *t* is often prefixed, as *tsatont*—place yourselve together; *ti stihei*—die ye two.

They use moreover the personal or future conditional in the place of the imperative, and they conjugate through all the numbers and persons, as, *áˌεθet*—that I may strike; *áchieθet*—strike then; *áhaθet*. Imperatives are never used in negative propositions, but in their place are used the negative particles, *ennon*, or *ennonehien*, or *tesasteθo*, answering to the negative particle *ne*, and governing after them the future, as, *ennonsken echiarasksa*—please not to go away; *tesastaθo eehiarasksa*—I wish you would not go away.

Of the Optative Mood.

The tenses of the optative mood do not differ from the tenses of the indicative, except in the prefixing of the particle *te*, and taking after them the particles expressing volition; *sen*, *asen*, *sken*, or *asken*, as, *teˌεθeθasen*—why had I not pounded? I would wish to pound. And thus this proposition is affirmative of itself; but it is negative when one says, I would not wish to pound, and thus it is to be spoken in the negative proposition, as, *ta sen*, *tˈe εθeθa*, *ta sentes arihsandera*, *inen*—I would that I had not sinned, or,

would to God that I had never sinned.

Of the Subjunctive Mood.

The tenses of the subjunctive are not different from the tenses of the indicative, except in the prefixed marks θe, or *deθe*, signifying if; as, *aeθetθe ʁannenhaen*—I would pound if I had any wheat.

When *de* is placed alone, it signifies when, and then it governs the future, as, if I had, if I did; nor is it ever rendered among the Hurons by the imperfect; but it is for the most part rendered either by the present or the aorist, or by the personal mood, as, we may sin; we may commit fornication if we sleep with women—*a,ʁarihʁanderai θeaʁendak ʁandɛ́θa*, or, *taaʁendak ʁandeten.*

The following negative propositions, if I did not pound now you would scold me, and, you would scold me, if I do not pound now, you would scold me some time from this, are spoken, the first thus, as, *kakʁen dihoton onte,ɛθɛθae*, and the second thus, *onta, ɛθetandenn, askakʁen dihaten.*

The perfect is mixed with the preterite, as is the perfect indicative, by having the initial *e* affixed, and also the final *k*. When the particle negative *te* meets with the particle θe, signifying if, then the first is changed into *ta*, or *onta*, as, would you protect me if I should not wear your clothes; as, *kiatonnonstatatichientaθe, aketas*, or, *ontaθeaketas desaton detaʁau, θechiaketas, &c.*

Of the Infinitive mood.

The infinitive has only the present. The participle of the future passive is rendered by the personal mood of the impersonal, *v. g. indaie ,d,aionke'tat*—a thing to be carried, or rather a thing which ought to be carried.—Observe that the infinitive mood of the Hurons is used in the same manner as with the French.

1o.—In itself signifying an indefinitive mood, as, one must eat.

2o.—For the object, or for food and drink.

3o.—For the act itself, as, for the act of mastication.

This phrase and similar ones, he will come to confess me, are thus rendered; he will come and he will confess me, *onhsaeskaon, θoatiesha, oronsas,* or *onhseeshaon, chiaeska,oroinsas,* or *onne'ichien,* or *orondeati.*

Note.—The futures which are used in affirmative propositions are not used in negative propositions, but only negative futures, *v. g. tesa,eθeθai,* or *te,eθeandi*—I will not pound, though one might say, *e,eθet*—I will pound. But as to *,esaeθetik*—I should have pounded it, is expressed in the negative, *asontesaeθetinke,enk*—I should not yet have pounded. When the final of the future or personal mood is without the temporal augment, it is the mark of the imperative mood, *v. g. skvatrendae'nda*—go and pray to God; *skvaierick*—let me be carried; *tsisaenk, shoerik, tooenk,* of the paradigma *s,* because the verb is of the paradigma *s.*

The aorists are not used in negative propositions, but in the place of the aorist is used either the present or imperfect, or the future, because the aorist has sometimes the signification of the present, sometimes of the perfect and imperfect, and sometimes also of the future, as, *aonrikvesser*—I shut your mouth, I will shut your mouth. But in negative propositions one says, *stanteskrikvh,indi,* or *stateskrikve,nidi,* or *stanteskikve,skrikve,indi,* or *stanteskikveindehe*—you will not shut my mouth. The aorist is often expressed in the place of the imperfect, and the present in the place of the imperfect. *Jesvsasen,eharaskva*—Jesus walked upon the waters. *Thaasenkandiskeaen*—as it would happen

if one went upon the ice.

The aorist is never joined to a negative, as, one does not say, *tea,aketat*—I have not carried; but *tea,aketak.*

Note 1o.—In composition certain words beginning with *,a,a,* change the first *a* into *on* thus one says, *onnhon,annondi*—to plot against the life of any one, from *onnhe*—life, and *a,anondi*—to labour.

2o. In verbs of motion derived from the negative futures, the present and aorist end in *e* but the future and the personal and imperative moods in *a*, as, *,atrendaende, atrenkaende,* and *heatrendaenda, satrendaenda, achiatrendenda*—I go, you will go, you go to pray to God, it is or it was necessary that you should go to pray to God. When any verb immediately after *a* has *h* it is the sign of the second conjugation, not of the first, as, *ta,ahetsatonhons*—pray for us, *h* which is immediately after *a* beginning a word indicates that it is of the second conjugation.

3o. The particle *since,* whether it is expressed in French sentences, or understood, is expressed by the Hurons by particles of locality, *et* or *est,* and by the particle of reduplication. *T.* as, *tetihtondechondi*—since the earth was made. *Teksa,atonhonti*—since I was resuscitated; *achinkatonga, deventatetetiasentato'ehirnen*—to-day is the third day after Sunday. *Teudi akentasati t'annont, achnik atonga onsahatonnhont*—he passed two days lying thus, and on the third he revived. One may also say, *achnik akentasate gonaio onsaha tonhont*—it is nine months since that.—*Entron onta a'ataton.*

4o.—Most substantives relative are rendered by corresponding words of the infinitive mood, *v. g.* Love—*atatennonhsendi*; honor—*atatechiendaen*; baptism—*atatendekwaieste*; confirmation—*atatendi,onnandite*; confession—

onsasatatrcnsandi; extreme unction—*ksatatiatoreenhon;* order—*atatenˌ di ˌenra'chondi,* (as if, *d'onna'ontri honten ˌahaehent d'ahachato ˌeti,)* marriage——*atatendiatanki;* communion—*aiataixaristiannonxsi.*

An indeterminate person with a relation is expressed always by a corresponding one, as, *stontatierha da ˌ orihsanderashon*—that which was done to sinners.

The word *sten* joined to a substantive signifies the manner, quality or material of a thing, as *tahtichiatsten*—how art thou made? *Teonnianniti chiatsten,* or, *chiasenksten*—I do not approve of your manner of acting or speaking. *Taotenti a ˌarihsten desarihsasan*—How is your book made. *Oshista a ˌasetsten*—a bottle made of metal.

5o.—The Hurons express their conception with the words to wish, to pray, as, I beseech you to pray to God for me, *sendiθa θndê di ˌerheahon, atren da enhas*—God has made me to honor him. *Ondehseridedie staha ˌiatichien,* or, *dehaiatichiai, aha ˌechien daen.*

6o.—A noun is of the masculine gender, when it begins with *h, t, θ, &c.* as, *tichion*—a star, *θentenha sθia*—the morning star; but when it begins with *a. e. i. o.* or *g.* it is of the feminine gender, as, *i ˌar*—the sun; *endiskara*—turning on the leg, *(piroutte,) onnhetien*—a wife; *ˌandicha*—a star.

Those which are expressed by words or rather by persons indeterminate, are made determinate only by joining particles to them, as, I have seen a horse, I have seen horses, *a ˌee ˌen ao chiatens ˌa ˌeen ondo toronton d'a ˌochiatens*

7o.—Where a determinate person is joined to determinate words it is to be considered as the marks of their dual or plural number. as, she has met Peter—*aθintrahan;* she

has met Peter and John—*aθontraha.* But when the person which is as the case of the word it is undeterminate, it is to be understood only as the mark of the person of whose nominative it holds the place, as, *a,ondia,i istaskʉa*—is it with a married person that thou hast sinned, or that thou hast lain? *onriakʉatraha nonʉe*—she has met some one.

This rule is only for absolute and not relative words.

Remark in that sentence the use of the particle *a* prefixed to words to signify a quality. *taota,a atʉtendᶜoki*—of what nature is a spirit? *stanθote,aatʉtenti kʉaatʉten*—they are not like us.

After the negative *te,* after *t,* and other particles of this mood the initial *a* is to be taken away. When the French locution and similar ones, they say no more, (ils ne disent plus,) mean a repetition of actions, they are expressed by the mark of reduplication with a negative, *stante shontonk.* Frequently in words ending in *ti sti, j* final is omitted, as, for *dʉandianndosti,* they say *kʉandianndast*—that which surrounds the finger, a ring, from *an,diea*—a finger, and *,annhasti,* or, *kannhasti*—to encircle.

80.—The first and third conjugations have many things similar, as have also the second and fourth. Observe that verbs of the third conjugation beginning with *enn* or *end,* differ from the manner of inflexion of *e,hiaras* in which the third plural of the paradigma *chi* and the third singular of the paradigma *s,* take *hon* in the place of the initial of the infinitive mood:—as *hondi,onraᶜenk*—they resolve, from *endi, ,onraθn*—to resolve, and *hondi,onrᶜaen*—he has resolved, not, *hennondi,onraen,* nor, *hatendi,onraen.*—Verbs ending in *enn* or *end* of this mood have sometimes *hiendi,onrᶜaenk,* in the third person dual of the paradigma

ch for *hnendi*, *onrdenk*. Thus *honnenda*—they hurry, from *ennonti*—to hurry.

Of the second conjugation in the paradigma *chi*, the vowel *a* of the infinitive is changed into *e* in the first and second singular; but in all the persons of the dual, and in the third persons of the plural it is changed into *i*; it remains indeed in the third person singular and in the first and second plural, this is shewn in the paradigma *gadeti*.

Of the fourth Conjugation.

In the paradigma *chi* the vowel *e* of the infinitive is changed into *i* in the first and second persons singular, in all the persons of the dual, and in the third persons of the plural; but it remains in the third singular and in the first and second plural; but in the paradigma *s*, *e* remains in the second person singular, in the second and third person plural. It is changed into *i* in the first and second persons dual, and in the third person dual and plural.

Note.—That certain verbs of this conjugation in the third person singular of the paradigma *s*, have *hasen* in place of the infinitive initial, but not *ho*, as, *hasenheon*—he is dead, *chihasentaksi*—he has done it on purpose. In the dual of verbs of this conjugation the affirmative *te* is often prefixed, as *te anditron*—he and I are here. *Tetitron*, *testriton*, *ten'ditron*, *tenditron*. *Teandiheons*—I and he are sick, *tetiheons*, *testiheons*, *ten'dihe'ons*, *tendiheons*.

Of the fifth Conjugation.

Verbs of this conjugation not begining with *on*, have in the first person dual of the paradigma *ch*, *an and* not *ann*; in the third person plural of the paradigma *ch*, *hend* not *enn* and in third person plural of the paradigma *s*, *hond* not

onn, as, *andor'iθa*—we two season ourselves, *hendor'iθa*, *hondor'iθa*.

Of Verbs of the Paradigma *s*.

There follow some verbs of the simple conjugations.—But it is enough to know how the perfect of each conjugation of the paradigma *chi*, is conjugated, that one may know how a verb of the paradigma *s* corresponding to such conjugation is inflected. See the examples in the simple conjugations.

Verbs of the paradigma *s*, in the aorists have the augment of the second person singular in *e*, as in the paradigma *chi* in the dual and plural.

Of irregular Verbs.

In the first conjugation, the verb *a* is irregular, because *a* of its first conjugation is retained in inflecting it, as if it had been of the third conjugation, as, present indicative, *θo,i,a*—I am as large, as, *θoi,chia*, *θo,r'ia*, *θoiʁa*. Dual *chiatianda*—I and he are of the same age, or of the same quality and greatness, &c. *chiatesta*—I and you, &c. *Chiatesta, chiatenda, chiatenda*. Plural, *ea,ʁas,ekʁas, eskʁas, ehendas, eʁendas*, they femenine are equal. Imperfect, *s,ak*. The perfect and pluperfect are wanting. They are supplied by means of the imperfect. The first aorist, *θoann'a,aha*—I am going to be as large as that very soon, *achiaha, ar'aha, aʁaha*. Second aorist, *a,aska, achiaska, ar'aska, aʁaska*. Future, *e,aha, echiaha, er'aha, eʁaha*.—Negative, *stante, ʁaento'che, sento'che, haʁento'che, aʁentoche*, from the verb *entondi*—to increase, I shall not grow any more. Present of the personal mood, *à,aha*. Perfect, *θoa,askʁa*—I shall be as great as that, *achiaskʁa*. Imperative is not used. Present optative, *θosente,a*—Why am I not as great as that? *θosentechia, &c.* Dual, *θosentateanda,*

θosentateta, or, *chiasentate anda*. Plural, *θosenteaʁas*, *&c.* Imperfect, *θosente,ak*, *chiah*, dual. *θosentate*, *andak*, or, *chia sentate andah*. In the second conjugation the irregular verbs, are :—

1st.—Verbs beginning with a double vowel, of which the second is not *i*; for they change their inital *a* into *i* for the first and second persons singular, in the other persons they follow *,aβeti*, *,aon*, for example, to arrive, has, *,ionk*, *chionk*, *haonk*, *,aonk*—I am arriving, &c.

2nd.—Verbs beginning with *and*, or *ann* both short, as *andaθaron*, *,annonten*, which have in the first person singular, *ndatane*, *innontenk*, without the personal mark *g*, and in the second person singular *statane*, *istontenk*, in the other persons they follow *aβeti*, except in the first personal singular of the perfect and pluperfect where they have *andaθaron*, *annonten*.

3d.—Those beginning in *ar*, which for the first person singular change the initial *,a* of the infinitive into *gr*, and for the second person only into *chr*, or *ch*, as, *,araʁen*—to pick; *raʁas*—I pick; *chraʁas* or *chaʁas*—thou pickest; *haraʁas*—he picks, in the perfect and pluperfect tenses they have *a,r* in the first person singular, as, *a,raʁen*, *a,raʁannen*, in which the diminutive *g* is not sensible.

4th.—Verbs of the paradigma *s*, beginning either with the double vowel *a*, as, *,aatando,aron*—to sustain a loss; or, *a,and*, as, *,ande'raʁaro*—to admire, or *a,ann*, as, *annonhʁandi*—to be sick, or, *a,ar*, as, *,arandi*—something to happen to any one, differ from *,aβeti*, or in the first person singular where they have *a,iatando,ares*, *anderaʁach*, *annonhʁach*, *aras*, in the other persons are declined as other verbs of the paradigma *s*.

5th.—*Katandi*—to stand up, in the dual is inflected as if it were of the first conjugation; in the plural and impersonal it is inflected as verbs of the third conjugation by retaining the letter *a* of the figure of its conjugation, as, *te,et*—I stand; *techiet*—thou standest; *tehat, te'at.* Dual, *tea,iat, tetiat, tetsat, tehiat, te,iat.* Plural, *teasat, teksat, tesksat, tehendat, tesendat.* Imperfect, *te,etak* or *etaskea*—I was standing, *chietaskea.* Perfect, *tesa,etandi, tesatandi, tekotandi, teotandi. Teoniatandi, tetsatandi, tehontatandi.* Aorist, *akebaha.* Future, *te,etaha.* Negative, *te,etache.* Imperative, *tisetaha*—stand thou. *Titsataha*—stand ye. *Titeataha*—we both. *Tikeataha*—we several. Optative, *tate,etasen,* or *xasentate,et, tatechietasen,* or *xasentatechiet.*

NOTE.—Also these two verbs, *,ario*—to kill, to strike, relative, *and,aro*—to chop, to fell wood, present, *rioch*—I kill her, *chrioch, haioch,* for *harioch.* Dual, *a,ioch, tioch, tsioch, hiriock,* plural, *a,eaioch. Keaioch, skeaioch, hatioch.*

Present singular, *raoch*—I fell wood; *chraoch, haroch, ,aroch.* Dual, *a,iroch, tsiroch, hiroch, ,iroch.* Plural, *a,earoch, kearoch, ske,aroch, hatiroch, atiroch.*

In the third conjugation, *ennon*—to go or come, see that verb through its tenses inflected in the third conjugation of simple verbs.

In the fourth conjugation *,en*—to say, present *i,i*—I say, *ichi, ihen, i,en,* it is not in use, but we use the verb, *i,atonk,* of the first conjugation. I say, *ichiatonk, ihatonk, ieatonk, &c.* as, *,aketas.* The imperfect is not in use, but it is had thus, *i,atonhonk*—I did say, *ichiatonhonk, &c.* Perfect, *iea,en*—I have said, *isen, iheen, ieen.* Dual, *ionnen, isten, ihonnen, ionnen.* Plural, *ionsen, iskeen, ihonnen, ionnen.* Aorist, *a'ihon*—I have been saying;

aehihon, ahenhaon, a˛enhaon. Dual, *aandihon, etihon, estihon, a'ndihon, andihon.* Plural, *aaɤenhaon, ekɤenhaon, eskɤenahon, ahendihon, ɤendihon, aa˛enhaon*—we say.—Future, *e˛ihon, echihon, ehenhaon, e˛enhaon.* Dual, *eandihon, etihon, estihon, en'dihon, endihon.* Plural, *eaɤenhaon, ekɤenhaon, eskɤenhaon, ehendihon, ɤendihon.* Imperative, *tsihon*—say thou, *stihon*—say ye.

The present of the personal mood, *a˛ihon*—I would say, *áchihon, 'ahenhaon, áenhaon.* Dual, *aiandihon, aetihon, aestihon, án'dihon, ándihon.* Plural, *aia˛enhaon, aekɤenhaon, aeskɤenhaon, ahendihon, ɤendihon.* Perfect, *aon˛enk*—I should have said, *aesenk, ahaɤenk, aiaɤenk.* Dual, *aionnenk, aestenk, ahonnenk, aionnenk.* Plural, *aionɤenk, aeskɤenk, &c.* Pluperfect, *aon˛ennen*—I might have said. The optative wants the present in the place of which we say, *te˛atonkásen*—that I may say; *techiatonkásen.* Perfect, *teɤa˛ensen˛*—that I may not say; *tesensen*—what hast thou not said? *Tehaɤensen, &c.* Pluperfect, *teɤa˛ennensen, tesennensen, tehaɤannensen*—I wish to God that I had said it!

In the fifth conjugation, *on*—to be together, is said of many. When *on* is alone we make use of the verb *a˛onhɤa* of the paradigma *s*—I am alone, or it is I alone. *Sonhɤa, haonhɤa, aonhɤa.* Dual, *onnonhɤa*—we two only; *stonhɤa, honnonhɤa, annonhɤa.* Plural, *on˛ionhɤa, tsonhɤa, honnhɤa, aɤronhɤa*—we three alone, or it is only we three. When the speech is of two, it is thus said, *teandi*—we are two.—*Teti, testi, te˛ndi, tendi,* from the singular. *i,* signifying me in Iroquois. But it is said, *a˛iɤe˛i*—I and he are together. *Tɤe˛i, tsiɤei, hiɤei, ˛iɤei.* Imperfect, *teandinnen, tetinnen.* Future, *teandik, tetik, testik, tendik, &c.* The personal mood, *t˛aiandik*—we should be together, he and I. *Taetik,*

taestik, tan'dik, tandik. When there are more than two it is said thus, *achinkia,ion*—we are three, *ia,onn*—we are with Peter. It is thus inflected, *attereia,ion*—we are eight; *attereition*—we and you are eight; *attereitson, attereihennon, attereisennon, &c.* Imperfect, *attereia,ionnen.* Future, *attereea,ionk.*

Of verbs wanting the crement.

Some verbs wanting the temporal crement, as well as initial as final, distinguish their tenses by setting after them, *i,en, i,ienn'en, ,ehen,* or, *isatonk*—they are of this sort; *asan, ,asendio, &c.* which are inflected in the following manner, present affirmative, *endi,esendioi,en*—I am the master; *isachiesendi,en.* Present negative, *endi,esendiot'e,en*—I am not master. *Isachiesendiot'e,en, &c.*

Observe. *I,en* is often omitted in the affirmative, in the negative never. Imperfect, *,esendio,ehen, chiesendio,ehen.* And the perfect and pluperfect, *,esendio i,enn'en,* or, *ehen.* The perfect and pluperfect negative, *stannendi ,esendio te cenn'en. Standesa chiesendio te,ennen. Aonst ,onneichien, esendio i,en. Endio* or *endi,esendio onn'asaton*—here I am become master. Future affirmative, *endi,esendio esaton, isa chiesendio esaton, or, e,enk*—I shall become master. Future negative, *stannendi,esendio t'esato'nde, standesa chiesendio t'esato,nde. Stannendi hasendio t'esaton'de.*—Imperative, *sasken chiesendio asaton,* become master. The personal mood affirmative, *endi,esendio a,enk*—I would be master of it. Perfect and pluperfect, *endi,esendio, a,ennen,* or, *endi,esendio asotonn'en*—I would have been master of it. Imperfect, perfect, pluperfect, negative, *stannendi ,esendio t'esatontend*—I should not be, or, I would not have been master of it. Optative present, *endisen,esendio te,en; iasen ,esendio te,en*—I wish I were master. Imper-

fect, perfect, and pluperfect, *endisen ˌesendio teˌennen*, or, *endisen ˌesendio te otonn'en*—oh that I was not master. Optative negative, *t'asen nendi ˌesendio θeˌen*—I wish I were not master. Subjunctive, present, and imperfect, *endiˌesendio t'eˌen*—if I may or might be master. Perfect and pluperfect, *endinde ˌesendio t'eˌennen*—if I had been master. Future preterite mixed, *de endiˌesendio eˌenk*, or, *eotonk*—whilst I shall have been master.

Of impersonal Verbs.

From verbs of the paradigma *s* are formed impersonal verbs from the third person singular feminine by prefixing *ag* to it; as, *aˌonraskʉan*—they are gone; *aˌoteiensti*—they have learned; *aˌoθar'ato*—they have done well; *aˌokerons*—it is feared; *aˌoatannonʉandi*—a fine rencounter has been made; *aˌaseia chens*—they are angry; *aˌasenheon*—they are dead; *aˌaorite*—the pot has been seasoned.

From verbs of the paradigma *ch* of the first and third conjugation beginning with *end* or *enn*, are formed impersonals from the third person plural feminine by taking away *g*, as, *onteiensta*—they learn; *oraskʉach*—they go; *onθa'rata*—they do well; *ondiˌon'raenton*—they think; *anionches*—they go and trade.

From verbs of the paradigma *ch* of the second conjugation are formed impersonals from the first person singular formed regularly in which *a* of the infinitive is changed into *e* by taking away *g*, as, *eθeθa*—it is pounded; *ehiatonk*—they write; *endatare*—they visit; *enteri*—we know; *enhʉanderach*—they fish. Many verbs of the fourth conjugation resemble verbs of the second, by retaining the figure *e* of the infinitive, as, *ietron*—some one is there; *deˌentron*, *eθiach* they carry, the canoe is passed by land where there is a fall of water; *deˌenθiaci*, *eθoˢas*—they change their abode;

de,ento͡sanetara—they are at rest; *he,entara, eten'θa*—it causes the hair to fall; *de,enten,ti,e͡sharonniak*—they are making cloth; *de,en͡sharondi, e'retsonniak*—they make snares; *de,en'retsondi, ennonniak*—they are making cloths of skins; *de,'ennondi.*

In verbs of the paradigma *ch* of the third, fourth and likewise the fifth are formed impersonals from the first person singular by prefixing *a*, as, *a,hiaras*—we remember ourselves, (on se souvient), *acheon*—they are sick; *a,onta* they season, the pot. In the fourth, *g* is not pronounced.

All impersonal verbs have the same tenses altogether which are found in the personal ones from which they are derived.—Thus, from *arask͡san*—to go, is made *onrask͡sach.* And those which are single follow the personal verbs from which they are formed, as well as to the final as the paradigma, to wit: if they are in the present, they follow the paradigma and termination of the present; and those which are of the preterite tense, follow the preterite of the personal verb.

Of the formation of Relative Verbs.

Of relatives, some are relative by themselves, others become relative by the addition of some syllables or letters, and they are thus formed. From absolute verbs, they may be made relative, by the addition of particles of quality.—*Ti, sti, k͡si;* as from *ete͡san*—to flee; *ati͡sati*—to make some one flee; *atehendi*—to be ashamed; *atehati*—to shame any one; *,aatachendi*—to be ugly; *,aatachati*—to make some one ugly.

Those ending in particles of this sort may be made relative by changing *i* final into *andi* for the preterite, and into *en* for the future affirmative, as, from the verb *,aθeti, ,aθetandi,* future, *e,eθeten, arih͡seo'sti*—to believe; *arih͡si-*

ɔstandi—to believe something of somebody, whether in good or in bad part; *ˌarakɔi*—to put in a plate; as, *ˌarakɔandi*—to put in a plate something for some one to eat.

Verbs in *a*, in order to become relative, add for the preterite *ndi*, and *has* for the future affirmative, as *ara*—to put on top; *ˌarʿandi*, *eˌerʿahas*. *Annontra*—to join ends; *ˌannhontrandi*, *eˌennhontrahas*. Verbs in *ɔan* add *di* for the infinitive, and for the future affirmative they change *n* into *s*, as, *ˌarʿaɔan*—take from the top; *arʿaɔandi*, *eˌerʿaɔas*. Verbs in *ɔi*, *hɔi*, and *gi*, become relative by adding for the infinitive *ndi*, and for the future affirmative by changing the last syllable into *sen*, as, *aterʿakaɔi*—to mark; *aterʿakɔindi*. *Eˌaterʿakaɔen*. *Ontrahɔi*—to put within; *ontrahɔindi*, *eˌontrasen*. Except *endeohɔindi*—to infect; future, *eˌendeohas*, *ˌarihɔandeˌra˙i*—to fish; *arihɔanderaˌindi*. *Erihɔanderasen*.

Add to these verbs in *ti*, because *ti* is changed for the present into *s*, as, *ˌandaɔati*—to dig whence, *ˌandaɔatindi*, *endaɔasen*. Thus, *ˌaenti*—to finish; *ˌaeritindi*, *eˌiensen*.—*Kɔatonti*—to be many in doing the same thing; *kɔatontindi*. *Aɔonatonsen*—many put themselves together to anoy him, or to help him; in like manner, *enri*—to leave, and its compounds, *ˌasenri*—to leave his plate; *asenrindi ˌeˌesensen*.

Verbs absolute in *kɔi* add *ndi* for the infinitive, and for the future affirmative, change *i* final into *as*; as, *ˌastaenxɔi*—to make; present, *astaenxɔnidi*; future, *eˌestaenxɔas*.

Verbs in *on* become relative by adding *di* for the infinitive, and for the future affirmative *ons*; *ahiaton*—to write; *ˌahiatondi*; future, *eˌehiatonhons*; except *atendoton*, which in the future has *eˌatendoton*; it may have in the infinitive *atendotondi*. *Ondi* and *ori*, with their compounds, when they become relative, change that *ondi* for the infinitive

into *onni enni*, and *ori* into *oranni*, and for the future affirmative into *eonnien* and *eoien*. Add to these *ˌaeren*—to make; relative, *ˌaerandi;* future, *eˌieren*. *Atonnhien*—to deny; *atonnhiandi;* future, *eˌatonnhien*, *atroˌen*—to make love; *atroˌandi*, *eˌatroˌas*. *Ataien*—to smoke; *ˌataianni*, *eˌataias*. *Ande˛en*—to sow; *ˌandeˌandi*, future, *endeˌas*. But *ˌaronˌen*—to listen, has *arˈonˌasennik*, future *eˌaronˌas*.

Verbs in *ent*, add for the infinitive *andi*, and for the future *has*, in place of the last letter *t*, as, *ˌahachent*—to hold a council; *ˌahachentandi*, *eˌchhachenhas*. *Atrendaent* to pray God; *atrendaentandi*, future *eˌatrendaenhas*. *Atient*—to sit down; *atientandi*, future, *eˌatienhas*. Add to these *ˌaen*—to put, and its compounds *ˌaentandi*, future *eˌienhas*, *ˌarihientandi*—to relate it to some one; future *eˌrihienhas*, *endiˌonrˈaen*—to deliberate; *endiˌonrˈaentandi*, future, *eˌendiˌonraenhas*.

Other verbs in *s* become relative by adding for the infinitive *andi*, and for the future *has*, as, *ateiachist*—to be in trouble, *ateiachistandi*, future *eˌateiachisthas*, or rather *eˌateiaˌhi˛as*. *Andandet*—to reply, to redouble; *ˌanˈdandeˈtandi*, future *eˌendandeˈas*. *Atsat*—to show; *atsatandi*, *eˌatsa˛as*. *Aaˈkont*—to hang to something; *ˌaaˈkontandi*, *eˌiaˈkan˛as*.

The remaining verbs, from being absolute and primitive, become relative by adding *enni* to the termination of the present, and rejecting that *enni* for the future, as, *atrios*—she is fighting; *atroseni*, future, *eˌatrias*—I will fight her; *ˌaaˌens*—she goes out; *ˌaaˌensenni*, future *eˌiaˌens*.—*Oˈkerˈons*—she draws for herself; *oˈkerˈonsenni*, *eoˈkerˈons*. In the same manner these become relative, *ˌatsiheniek*—she burns; *ˌatsiheniessennik*, future *eˌetsiheniens*, negative

senihe. *Oharek*—she washes; *ˌa,asek*—she rows.

Some verbs, that they may become relative, not only add *enni* to the present, but also change its final syllable in *en* or *on* into *a*, as *atehens*—she is ashamed; *atehasenni*, future, *eˌatehas*. *Aseiachens*—she is in a passion, of the third conjugation, *aseiachiasenni*. *Enheons*—she is sick; *enheasenni*, *ˌannhʻatsskaron*—she lops the branches from the trees; *ˌannhatss*, *karasenni*, by contraction for, *ˌannhatsskarasenni*. Thus, *onharons*—she weeds; *onrʻasenni*. *ˌAencchon*—to flay; *ˌaenchasenni*. Remark that all the aforementioned verbs agree with each other, as to the infinitive, present, imperfect, perfect, pluperfect, the negative, personal mood and the future negative, and are thus inflected, present *ndik*, or *nnik*, imperfect *nditnk* or *nnihik*, the perfect *ndi* or *nni*, pluperfect, *ndʻinnen* or *nninʻnen*, future negative, *ndihe* or *nnihe*, future of continuation *ndihi* or *nnhi*, future negative removed, *ndihiˌehenk* or *nnihiˌehenk*. The negative personal mood, *ndihenn* or *nnihen*, also the improper aorist, as, *askaθaratandiska*—thou hast thought me obliged.

We use relative verbs doubly under a different sense, as, *haˌeθeθa*—he pounds or he tramples upon me, and *haˌcθetandik*—he pounds something for me. Thus, *haˌienchons*—he flays me; *haˌienchasennïk*—he flays for me; *haˌokaʒi*—he has daubed me; *haˌekasandi*—he has daubed something for me.

The aforesaid rules for the formation of relative verbs not only answer for derivative and simple verbs, but also for passive, reciprocal and deponent ones, as, *aʻtaseti*—to be hid; *ʻatasetandi*—to be hid from some one; *haˌaʻtasétandik*—he hides himself from me; and *ataʻtaseʻtandi*—to hide from one another. *Atiataʻtondi*—to wander, to escape;

atiata'tontandi—to escape from some one; *ha,atiata'tontandi*—he has escaped from me.

Nearly by the same rules are formed some neuter acquisitive verbs from other neuter absolute verbs, as from *orahens*—that boils; *orahasennik*—the pot boils for me; *ori*—that is cooked; *onsenni*—that is cooked for her; *,a,aonk*—that is old; *,a,aonsennik*—that becomes old to her. In like manner some neuter passives are formed, as, from *otendor'onasi*—that is difficult; *otendor'on ɤandik*—that is impossible for him. Thus *otrihɤochate*—the affair is spoiled; *otrihɤa'chatandi*—the affair is spoiled for her; *ota'hahaɤe,indi*—the road is stopped up for her.

When several persons meet, relatives affixed to the same verb, as, beseech him for me, they repeat, or they say the relative verb twice, as, speak to him and beseech him for me, *hesatatia. Ta,ehetsaronhons, aha,iten*—speak to each other or go and exhort N. tell him to have pity on my brother, in speaking of me or in naming me.

Of Frequentative, Multiplicative, and Augmentative Verbs.

Augmentatives are made from the present, by only adding *s* to *skonɤan* or *konnou*, it ends in *s* or *ch*, as, *hotatiaskon*—a great speaker, from *atatiak*—he speaks; *ɤenskon*—he does nothing but say that, from *ihen*—he says; *horihɤanderaskon*, from *horihɤoch*—great fisher.

Note.—These augmentatives are always of the paradigma *s*, *hotendotonskon*—great relater; imperfect and pluperfect, *onnenhotio,askon*—great lewdness, from *atro,en*—to make love; present *oxa*, *x* being changed into *g*.

The multiplicative are those which are about a manifold object; they are formed from the future negative, by changing *e* into *on*, and follow the paradigma of a primi-

tive verb, as, *aontenhaan harihsanderaxonk* from *tsharihsanderaxe*, it has *on* in the preterite, in the aorist, future and imperfect, *ononk*, and in the pluperfect *onk*, in the future negative *onde*, there is added to these *nion*, *anssi*, as, *harihsanderaxonnaonk*, they form their tenses as the preceding. From these rules, except *ateskset*—to grow old; future *tande*, multiplicative *tan'nion* for *tannon*.

Other multiplicatives are deduced from verbs ending in *i* and multiply the object; and are formed from the present infinitive by adding *aion*, they follow also the paradigma of its verb. Thus from *atit*—to embark, is made *atitaion*—to embark several, and from *aksarit*—to embark something; *aksantaion*—to embark several inanimate things; and from *,natit*—to embark an animated thing; *natitaion*—to embark several living things. In joke, I would say *natitaionnion*.

Hence also are multiplied its compound words from *st*, but adding only *on*, as, *onnontst*—there is a mountain; *onnontston*—there are several mountains; *annantstonnion*—there are mountains innumerable, may be superadded, and these derived from the substantive *st*, have *on* in the present. Its compounds *a,oen*—to have, or have any thing (to have is of paradigma *ch*, as, *i,aen*—there is some) they have *ton* for the multiplicative; to have is of the paradigma *s*, as, *isaen*—thou hast. *On'de'chonton* for *onde'haenton*, as *ondechon* for *ondechaon*.

From *,ontare*—there is a lake, is formed *,ontarenkaonnion* there are several lakes. *Isache*—there is water; *achanhannion*—there is a quantity of water. Thus also from *atendotonk*—she says, is formed *atendotonk,annionk*, by *k* in the present. From *ar,or,ara*, is formed *andar*—there is a space, and from this is formed the multiplicative *anda'*-

ronnon—several points of space, in space of time or place. From *onnianni*—good, is made *onnionnihaton*—all sorts of goodness. There are other multiplicatives formed from the final of the infinitive by adding *haton* to the final, as, *hattindia,ihaton*—those that are married in divers places.

There are also others which signify as it were collection, as, the Normans, the Gascons, and all the other French; *aesti de stan aṇatia sontie d'háti'nnionenak*, for the feminines, *ahsatiasontie*. From *annonten* is made *annonten haron*—to give several things; when it is relative, it is of either paradigma. There is also another multiplicative or frequentative answering to the French numeral locution, *prise et reprieràs-tu?*—hate and hate to the end, grudge and thou shalt be grudged. *Asennhaten. Asennhaten*—for one; for more; *atsinnhaten ichien, atsinnhaten. Asatrendaen ichien asatrendaen, &c.* In the passive it is very irregular which happens in some verbs of the second conjugation, as, *asai*—to be killed (of many) from *achia,i*—to kill, to consume. And *asarinn'on*—to be dragged; from *achare*—collar; and from thence to drag, as if it were, to drag him by the collar.

Of the Reduplicate and Local Particles, which are joined to Verbs.

The reiteration of action which the French express by inseparable particles, *reconduire, resusciter, redire;* we express also by inseparable particles or letters, like those which the Latins express by the particles of place, *hic, illic, istic*, and the French by the particles *depuis que*, which we express by inseparable particles or letters prefixed to verbs or nouns, as to the place or time of which we speak.

The repetition of action, for its mark in the paradigma *chi*, or in the tenses of the paradigma *ch*, except the aorists,

the imperative, the personal, and infinitive mood, has *s* in singular and in the third person dual and plural, and *tsis* in the dual and plural. But note 1o.—That when that *s* is placed in other tenses, in the future it is inserted after the augment *e*. 2o.—That *g* following will be changed into *k*, whence it is said *skaraskʋas*, not *s,araschʋas*. 3o.—That when the third person singular feminine beginning with a vowel, admit no component particles but insert ʋ, it is not said *sʋ* or *tʋ*, but *k* is inserted after *s*, as *askʋas*—she departs for the second time, not *sʋaraskʋas* nor *saraskʋas*. 4o.—That one or a double consonant following after *ts*, by adding *i*, it is said *tsi*, as, *tsitiaraskʋa*, *tsikʋaraskʋa*, *tsitsaraskʋa*, *tsiskʋaraskʋa*. 5o.—That if *i* pure and short follow after *s*, unless the aspirate *n* be in the middle, it perishes entirely, but *i* before *h* requires *t*, as, *tsharaskʋa*, not *shiaraskʋa*. 6o.—That when the letters *nd* joined together have *t* before them, they perish, but if they have *s* by itself, *s* is changed into *ts*, and they perish, say *ndehiar'as stehiaras*, of the repetition of the perfect pluperfect, and of verbs of the paradigma *s*, excepting always the aorist, *s* is for the first person singular and all the third persons masculine, and for others *ts*, and preserving the rules already delivered, as, that *s* following ʋ takes *k*, because as the first person of the perfect in composition takes ʋ before *se* you say *skʋa,araskʋan*, not *sʋa,araskʋan*; hence also is said *tsisaraskʋan*. The mark of repetition for the imperative is *sa*, as, *sasaraskʋa*. The mark of repetition for the personal mood is *aons*, as, *aonsa,araskʋa*, for the aorist it is *ons*.—Where observe that the final letters *s* or *t* of these particles as also of the following for locality, they are pronounced joined with the following syllables, as, *aon sa,araskʋa*, not *aons a,araskʋa*. The mark of repetition for all impersonal

verbs, as, *isas*, *astsonraskʁrk*—they go for the second time.

The mark of locality for the indicative, subjunctive and optative of the paradimga *ch*, except the aorist, *(et)* for the singular and the third persons dual and plural and for others, *(eti)* by preserving those which we have spoken of above of the particles *s*, unless *t* before, *g* does not require *k*, but perishes altogether. Hence it is said, *ekaraskʁas*, not *etkaraskʁas*. Moreover *(et)* or *(eti)* is always set before, even in the future. The mark of locality for the preterite and verbs of the paradigma *s*, except the aorist is, *et*, for the first person singular, and for all the third persons masculine, but for the others *eti*. But in the first person it is said, *ekʁa‸araskʁan*—I am gone from there, for *eta‸araskʁan*, or rather *ekʁa‸araskʁan*.

The mark of locality for the imperative is, *a*, as, *asaras kʁa*—go from thence to come here. The mark of locality for the aorist is *ont*, for the personal mood it is *aont*, for impersonals it is *ete*. When reduplication and locality meet at once *s* is always and every where the mark of reduplication and prefixed to the mark of locality, *et, ‸eti, ont, aont*, except one imperative, where it is only *sa*. See the examples among the conjugations.

Of the different tenses of a relative verb signifying reduplication and locality.

Note 1o.—In the present, imperfect, perfect, pluperfect, future negative and the personal negative mood, nothing is changed in affixing the initials, but the finals only are changed for the diversity of tenses, thus, you say, *‸onendiθa*—I beseech you; *‸onendiθak, onendiθi, ‸onnendite'nnen, stante, ‸onenditan'de, te‸onenditandenn*, where the initial *on* is never changed but only the final as the diversity of tenses requires.

Note 2o.—When the relation is to the feminine of the singular number, then the persons of the relative verb do not differ from the persons of the simple verb, and they admit before them the same particles to signify the aorist, future, the personal mood, the repetition, locality and diversion, as if they were persons of the simple verb.—Wherefore say, *a,akakʁach*—she beholds me; *on,akakʁa*—she has just paid me a visit; *aon,akakʁa*—she ought to have paid me a visit; *eʁa,akakʁa*—she will see me, like the rule of a simple verb of the paradigma *s*.

Note 3o.—In the other persons of the relative verb put for the future *e*, for the aorist and personal mood the initial *a*, as, *akakokʁa*—lo! I see him; *asa,iaka asa,iakakʁa*—we both see him; *asa,ʁakakʁa*—many of us see him; *ehakakʁa*—I will see him, and *axeakakʁa*—lo! I see them; *ahechiakakʁa*—lo! thou seest him. In all persons relating to others indeterminately which commence with a vowel, prefix *ai* to signify the personal mood, as, *aiaxiaka'kʁa*—we should see them; *aionxiaka'kʁa*—we should be seen by them; *aiesθakakʁa*—we should see you; *aietsiakakʁa*—we would see you; *aion,aka'kʁa*—they would see me; *aionka'kʁa*—they would see her; *aia,okakʁa*—she would see the world, indeterminately. Thus with reduplication, *aonsaiaxiakakʁa*—we should see him a second time; *aonsaionxiakakʁa, aonsaiesakakʁa, aonsaietsiakakʁa, &c.* Thus particles of locality, *taontaionxiakakʁacha*—that we return to see. *Taontaiesakakʁacha, taontaietsiaka'kʁac'ha.*

But in the aorist, *onsa* only for the reduplication and *onta* or *tonta* for locality is placed before all the relative persons excepting those which denote the singular number feminine. These do not follow the rules of the simple verb. In the imperative say for the reduplication, *onsata,akakʁa*

—look at me once more; *onsata,iakaksu, onsata,sakaksa.* For the locality say, *ata,akaksa*—look at me from there; *ata,iakaksa, ata,sakaksa.* For locality and reduplication at once, say *tontaha,aka'ksacha*—come from thence to see me here. *Tontata,iakaksacha, tontata,saka'ksacha;* without the aorist, the personal mood affirmative and the imperative reduplication is expressed by the letter *s;* thus as, when it is prefixed to the letter *g,* it is changed into *k,* as, *skonakaksach*—I behold you another time; *skiaka'ksach sksakaksach,* from the persons *'onakaksach, ,iakaksach, ,sakaksach.* In relation of the second person to the first, as, *skakaksach, skiakaksach, sksakaksach;* in like manner in anomalies of the second conjugation, beginning with *a,and* or *,ann, t* is changed into *θ,* and *k* into *x,* thus for *istontek*—thou givest to me, say *isθontenk*—thou restorest to me; *eskechiendaen*—thou honorest me; *sxechiendaen*—thou honorest me again, or you render me honor. When it is put before the letter *h* it is changed into *s* pure, pronounced with the aspirate after *s,* as *sa'ka'ksach*—I regard you a second time; although it can also be written *shaka'ksach.* But when *s* is said to be put on the person beginning by *s,* the new letter *s* is not added, as, *saciakaksach*—we two, we saw him a second time; *eskennhek*—thou shalt swear to me; *eskinnhek*—thou we both; *eksannhek*—thou we several. The other persons beginning with a vowel prefixed to *ts,* as, *tsesak'ksach*—we did see you again. *Tsetsiaka'ksach, tsaxiakaksach, tsonxiakaksach, tson,akaksach.*

Locality without the aorist, &c. is expressed by the particle *et,* in this manner, when *g* is prefixed, that *g* is changed into *k,* and the *t* is struck out. *Ekonaka'ksacha* for *etkonaksacho*—I shall come and see you from there. *Ekiakaksacha, eksakaksacha.* When also it precedes the

letter *h*, *t* agreeing with *h* can be changed into ϑ, as, *eϑa˛aka'kʁacha*—he will come to see me from there. But when it ought to be placed before the person beginning with *s*, this supplies instead of *t*, as, *eson˛iakakʁacha*—he will come to see us two. *Eson˛ʁakakakʁacha*, and the other persons beginning with a vowel *eti* is prefixed to denote the locality, as, *etiesakakʁach*—they behold you from thence; *etioxiakakʁach*—they behold us from thence.

Of the particle *te* of duality.

What we call particles of duality, division, reciprocation, and totality, follow the particle of locality, *e*, by changing *e* into *a*, not in all the tenses but only in the aorist; *onnakonnonron kʁannion*—behold I am going to honor or salute, *akinnon ronkʁannion*, *&c.* In the imperative say *titannonronkʁannion*—salute me; *tita˛innon'ronkʁannion*—salute us; *tihestonr'on kʁannion*—salute him. In the personal mood, *tahannonron kʁannion*—let him salute me; *tason˛innonr'on kʁannion*—let him salute us two. In other tenses *te* is to be placed as *tehannonr'on kʁannionk*—he salutes us two.

The paradigma of a relative verb with notes reduplication, and locality, the example of which may easily be inflected other relatives with a similar mark of locality. Let it be *onta'annhe*—to please any one. See the conjugations through moods and tenses.

Of verbs assuming *te* the mark of duality, of affirmation, or of totality.

In one aorist the same method is to be preserved as was observed a little ago in the use of particles of locality. In other tenses *te* is prefixed to each person, as, I cry, *te˛a'asenxʁas*, *te˛hiasenxʁas*; imperfect, *te˛a'senxʁaskʁa*; perfect, *teʁa˛asenxʁi*; future, *te˛a'senxʁa*; negative, *tate˛asenxʁache*; aorist, *aka'senxʁa*, *asasenxʁa*, *athasenxʁa*,

akʁasenxʁa; dual, *atia¸ia'senxʁa, atitiasenxʁa, atitoasenxʁa, ahiasenxʁa, akiasenxʁa;* plural, *atia¸ʁa'senxʁa, atikʁasenxʁa, atiskʁasenxʁa, atho'nsenxʁa, ako'nsenxʁa;* imperative, *tesasenxʁa*—cry; *titsa'senxʁa;* personal mood, *ta¸ásenxʁa, t'achiasenxʁa;* dual, *taia¸iasenxʁa;* optative, *tate¸a'senxʁachasen;* in the future, *kʁasenxʁi*—to cry. Thus *kaia¸ri*—to play, *kʁatrandi, &c.* When the particle *te* meets with reduplication it is inflected, *teskasenxʁach*—I cry; *tesa'senxʁoch, te sha'senxʁach,* by prefixing *te* to the verb conjugated with the mark of reduplication. Aorist, *tonsa a'senxʁa*—I am going to cry; the personal mood, *ta'onsa¸ a'senxʁa.* When the particle *te* meets with the particle with locality it is thus said, *te ϑa'senxʁacha*—he will cry; aorist, *tontaha'senxʁache*—he is on the road coming here to cry. When the particle *te,* negative, precedes the particle *te,* dual, nay another which is also *te,* whether dual or affirmative, either of locality or distance of time, it is changed into *ta,* as, *stantatehasenxʁash*—I do not cry; *stantsa'tentatendi*—he is with no one; *¸aro te ϑaʁeti*—he is returned on this side; *stan¸aro ta te ϑaʁe'ti*—he did not return on this side; *tehotonharen'ronk*—he is sick; *stantatehotonharen'ronk*—he is not sick; *a¸endi¸on'rato¸endi stihochiatorha*—I know how much pain he feels; *a¸endi¸onr'ato¸endi. Statehotonharenr'onk*—I know kow sick he is. In this last example *sti* is changed into *sta* because it follows the affirmative *te.*

The infinitive of verbs admitting *te* dual or affirmative begins in the first and third conjugation by, *kʁ,* as, *kʁatrandi*—to meet some one; present *trach,* future *traha,* negative *trache. Kʁenten*—to go and come in a day, in the second and fourth conjugation by *k,* as, *kaia¸i*—to play; *kenteia¸i*—to pass a carriage. In the fifth by, *ti,* as, *tionnhontaionʁan*—to torment. *Te* affirmative with verbs

of the paradigma *s*, as, *ksatonharenron*—to be sick. It is thus compounded, present *tesa,atonharenr'onk*, *tesatonharenr'onk*, *&c.* Aorist, *aksa,atonharenr'on atisatonhar, atotonk, atiotonk.* Dual, *ation,iatonh, atitsatonh, athondatonh, ationdatonh.* Plural, *ationsatonhatisksatonh*, indeed it is inflected as the tenses of the paradigma *s*, signifying locality by placing in the beginning *a*, of its place.

The personal mood, *taon,atonh, taesatonh, tahotonh, taiotonh.* Dual, *taion,iatonh, taetsatonh, tahondatonh, taetsatonh, tahondatonh, taiondatonh.* Plural, *taion,satonh, taesksatonh.*

Of the Verbs of motion.

Ennon—to come, simple verb, present *Iee*—I come or I arrive, here I am come, here I am arrived.

I come—*I,,e,*	DUAL.
Ichie,	*Iande.*
Ihre,	*Ite.*
Ise,	*Iste,*
PLURAL.	*In'de.*
Ia,se,	*Inde.*
Ikse,	——
Isksе,	*Ier*—they come.
Ihende,	IMPERFECT.
Isende,	*Ieenn*—I did come.

I am come, I was come, it is taken for the imperfect; perfect and pluperfect, as to termination and signification.

I,enn,	*Ichien.*

A Verb with reduplication.

Iske—I come again,	*Ische.*
Ise, Ishrė,	*Isksе.*
DUAL.	PLURAL.
I and he,	*Itsa,se.*

Itsande, *Itsikɛi.*
Itsite, *Itsiskɛe.*
Itsiste, *Itshende.*
Isthe, *Iksende.*
Iste, *Ihen*—they come again.

Which is in use for the imperfect, perfect, and pluperfect in the simple verb, it is also in verbs with reduplication, in verbs with locality, and in verbs with reduplication together with locality. There is an exception.

Isken, *Isenn.*

A Verb with locality.

Eke—I go from thence

		DUAL.
Ese,	*Ekɛe,*	*Etiande,*
Etre,	*Ethende,*	*Etite,*
Etiste,		
Ethe,	*Eksende,*	
Ete,	*Etien*—they go from thence.	

PLURAL.	IMPERFECT, &c.
Etiac, &c.	*Ekeen.*
Etikɛe,	*Eseen.*
Etskɛe,	

A Verb with reduplication together with locality

Teke——I return from thence.

Tese,	*Tete.*
Tetre,	PLURAL.
Tekɛe,	*Tetiaɛe.*
DUAL.	*Tetikɛe.*
Tetiande,	*Tetiskɛe.*
Tetite,	*Tehende.*
Tetiste,	*Teksende.*
Tehe.	*Tehenn.*

IMPERFECT, &c.

Tesenn, as the present.

ˌAroekʁaˌéti—I am come from thence.—Hence :

Etiseʿti—thou ; *eθaseʿti*—he.

Etiaʁʿeti—she.

DUAL.

Eteondʿeti—we are come hither we two.

Etisteʿti—you.

Ethondeti—they, masculine.

Etiondeti—they, feminine.

PLURAL.

Etionʁeti—we, several.

Etiskʁeti—you.

Eθondʿeti—they masculine.

Etiondʿeti—they feminine.

Tekʁaˌeti—I am returned from thence.

Tetisʿeti.

Tethaʁʿeti.

Tetiaʁʿeti.

DUAL.

Tetiondʿeti—we are returned from thence.

Tetisteti.

Tethondʿeti—Tethiondeti.

PLURAL.

Tetionʁeti—Tethondeti.

Tetiskʁeto—Tetiondeti.

ˌAroekʁaˌetinnen—I was come from hence, can be said either way; *xaiˌennʁxaekʁatinʿnen*—I was, or I am come from thence, which is common to all other verbs of motion, as, *atrendaʿendenn* or *ekʁaˌatiendaennonʿnen*—I was or I am come to pray to God. *Eʁaˌennon* or *eʁaˌeti*—I am gone; *esenʿnon* or *eseti*—thou art gone.

Future, *e,et*—I will go hither, to express the termination to which, *eent*—they will go hither, or it is said, *e,e, echie, ehre, ese.* Dual, *eande, ete, este, en'de, ende.* Plural, *easse, eksse, eskse, ehende, esende, een.* Remark, the following future is used with the particles to express the following, first and second persons. *Teke*—I will come or I will return from hence, *tese.* Dual, *tetiande, tetite, tetiste.* Plural, *tetiasse, tetikse, tetiskse, tetien*—they will return, to express the third persons it is said, *earo*—to be, he will come here; *eksse*—she; *eθe*—they two; *ete*—they two; *ethende*—many; *eksende*--many. To express the termination by which it is said *a,etande* or *a,et*—I shall go there; *,aentande*—they will go.

Aorist, *a,e, igo, aehie, ar'e, asse.* Dual, *aande, ete, este, a'nde, ande.* Plural, *aa,se, ekse, eskse, ahende, asendeaen*—they go; *onne, iske*—behold I come again; *onni i,e*—behold I come; *onta,e*—I come from thence. Impersonal, *ontaen*—they come from thence; *tonta,e*—I return from thence; (showing the place from whence one is gone), as, whence comest thou? *Annenontachie?*—I come from Quebec; *teatontari,eonta,e,aen xsa'ketonta,e*—I return from the fields. But to express, I come or return from hunting, is used the single word *tesa,ate'ndasachennen*—I come or I return from hunting, I was gone to hunt. Thus *a,atrendaennonn'en*—I come or return from praying to God; and yet a kindred signification of the verb is this, I was gone to pray to God; *a,earohosonnen*—I come or I return from fishing. The present of the verb *ennon* is sometimes used, as, *onniske d'a,atien daen non'nen*—I return from praying to God; *onne iske d'a,a'kisannen*—I return from war. Future in the first and second persons, *stantateke'se'*—I will not come, or, I will not return. *Stantateses'e,* or,

stantatek,a,ennon, or, *stantatetisennon*—thou; *stantatetiondese*—I and he; *stantateties'e, stantatetiestet'e, stantate tia,ses'e*—we and he; *stantate tiksese', stantatetisksese'*, or *stantate tisksennon*. To express the third person it is said *stante'tre'se, stante'thasennon. Stante'thes'e*, or, *stantethondennon*——they several.

Imperative, *se*—go, depart; *sarasksa*—let him go; *ste*—go ye; *tsarasksa*. To express this sentence, come here, or this, go from there to come here, *a* is prefixed to the imperative, as, *asarasksa*—go from there to come here; *,aroaste*, or *aoaste*—come here; and thus of all verbs of motion, as, *tson*—enter; *atson*—enter here; *tsion*—enter ye there; *atsion*—enter here; *tontasion*—enter, *tontas arasksa*—come from there here, go from there where you were, go to return here.

Note.—The same verbs of motion as are used to signify to go, as to signify to come, of the same person, the marks of locality are prefixed; but when they express the word to go, no person is prefixed, as, *harasksa*—he goes; *etharasksa*—he comes from that place; *horasksan*—he is gone; *ethorasksan*—he is gone from there to come here; *eharasksa*—he has just gone; *ontaharasksa*—he has just gone to come here; *aharasksa*—let him go; *aontaharasksa*—let him come here; *eharasksa*—he will go; *ethorasksa*—he will come here.

Optative, *endi sente,e*—that I wont go; *isasentechie*, not *sen'chri*. But to signify that he does not come, it is said *sentetre*, as in the manner we have explained.

Mixed difficulties which occur in verbs of motion, occur then, when at the same time are indicated negation, reduplication, and locality, which particles ought to be place, which follow will be explained by the following

examples: *harasksach*—he goes; *stante harasksach*—he does not go; *sarasksach*—he goes for the second time; *stante sarasksach*—he does not go for the second time; *etharasksach*—he comes from that place; *stant etharasksach*—he does not come here; *te tharasksach*—he will return to this place; *stanta tetharasksach*—he does not return here; *ontaharasksa*—he has just gone to come here; *tonta harasksa*—he set off a second time to return here; *stante thoraskʂan*—he does not go; *stantate thoraskʂan*—he did not set out again to return here; *tetharaskʂachasen*—ah that he did not go from there! *tasente tharaskʂach*—would to God that he did not depart; *andoron d'araskʂan*—it is difficult to go; *ˌandoron ontaʂaraskʂan*—it is difficult to depart from there; *andoron d'onsaʂaraskʂan*—it is difficult to return there; *ˌandoron tonsaʂaraskʂan*—it is difficult to return here; *stanteˌandoron d'araskʂan* and *stanteˌandoron onsaʂaraskʂan*—it is not difficult to return here.

Of the relations which are of the paradigma *s*. We and thee in all conjugations are of the paradigma *s*, however formed from the second person singular of the paradigma *s* by prefixing *e*, as, *satendoton, esatendotondik, saθeti, esaθetandik* signifies we both, or we more, them, they, thou, from us both or more, thou from some.

We, you, or we both, more, that they both, more, or some of you, that to you from us, is of the paradigma *s*, however it is made a *tsatendoton*, by prefixing and inserting *i* between *s* and *a*; thus it is said *etsiatendoton, etsiθetandik*.

Universal rule for all relative conjugations together.

The relation of the third person singular, dual and plural, to the first and second persons singular, dual and plural, is expressed by a verb which ought to be accounted passive, though it is not; and inflected like the paradigma *s*, as he

me, she me, that is I from him, I from her. *Haa,atendotondik* is made from the first person singular of the preterite tense, *a,atendoton,* by prefixing *ha* for the masculine, *a* simple for the feminine, *son,iatendotondik,* he to us both, or us both from him, is made from *on,iatendoton,* she to us both, that is, we both from her; from thence it is formed by adding nothing. Thus *son,ʁaten'dotondik,* and *on,ʁatendotondik, hon,atendotondik*—they me, that is I from them, is formed from *a,atend,* by taking away *a* and prefixing *hon* for the masculine, and *on* for the feminine, which is the personal and numerical mark; *haon,iat*—we both from them; hence it is made by inserting *a* between *h* and *n,* also *,aon,ia, haon,ʁat* and *,aon,ʁat;* but *on,atendotondik*—I from another.

Of frequentative verbs, see page 165.

Of passive, reciprocal and deponent verbs.

Passives are formed from actives by prefixing *at* to the first person of the present indicative by taking away *g* in this manner.

Ataseti—to be hid from; *,aseti*—to hide, of the first conjugation. *Atchiaton*—to be written, from *,ahiaton* of the second conjugation. *Atiarondi*—to make one's self a bag, from *,arondi,* of the second conjugation. *Atrihʁaiensti*—to learn, from *,arihʁaiensti*—to teach, of the second conjugation. *Otendoronkʁi*—the thing is made difficult; *a,andoronkʁi*—to esteem the thing of importance,; *kʁaten'nontra*—to follow between, from *en'nontra*—to follow, of the third conjugation. *Atehien*—to give in commission, from *etnei,* relative. *Otecoʁan*—the water is taken away, from *e,oʁan*—to remove water. *Otoriti*—that is seasoned, from *onti*—to season, of the third conjugation. *Hotonnhonti*—he is put into the world, from *onnhonti*—to put

into the world, of the fifth conjugation. *hotokaʉsi*—he is daubed, from *okaʉsi*—to besmear, of the fifth conjugation, from whence it is evident that all those passives are of the first conjugation from what ever relative they are derived, are excepted from this rule.

1o.—Verbs of the second conjugation beginning with *a,a*, as, *saka'kʉendʉsten*—put your eye there to see what takes place, for *sate,aksendʉsten*, from *a,aksenda*—the round of the eye; *sakon'chioten*—show your face, for *sateonchoten*, from *a,onchia*—face.

2o.—Those beginning with *ah*, as *a'xʉen'dori*—to beat about an island, to spear and kill the game that is there, for *atase'ndori*, from *,ahʉendori*. *Akʉichoton*—to have force; for *atehʉichoton*, from *,ahʉichoton*—to have force. *Akonande,en*—the canoes are near each other; for *atehonande,en*, from *,ahonande,en*—to put canoes near each other.

3o.—Those beginning with *aʉ*, as *ahʉendaen*—to be obeyed; for *ateʉendaen*, from *aʉendaen*, as *honaʉendaenk*—they obey him. *Akʉendiosti*—to take some one for master.

4o.—Verbs of the fourth conjugation which in place of *at* prefix *end* of the first person singular of the indicative, by taking away *g*, as *,endinnonniak*—I am making myself a gown; from *,ennondi*—to make a gown. *Endiʉharichiai*—to make one's self a garment; from *,eʉharichiai*—to make a garment.

Note.—Some verbs of the second conjugation commencing with *,an* by changing their second conjugation into the third, become passive, as *eʉenntienhichien*—the wheat will be ripe, for *eʉatennenhichien*. Some become passive by adding, besides changing its conjugation, the syllable *di* in the middle, as *ahendienchaʉa*—he has descended from his place, from *,a,enchaθ*.

NOTE.—*Saskwi*—shut your mouth, for *satechiage*; it passes from the second conjugation to the first. Most passives are made in the same manner, as from *ˌachondi*—to accommodate; *achandi*—to accommodate one's self, to dress.

Reciprocals are formed from those passives by the addition of another *at*, as *ataseti*—to hide one's self, or, to hide each other, from *ataseti*—to be hid. *Atatehiaton*—to attach itself to me, from *atehiaton*—to be attached to me. *Atahihsaiensti*—to instruct one another; from *atrihsaiensti*—to study; *atatonnhonti*—to give life to one's self, or, to give each other life, from *atonnhonti*—to receive life. But in the fourth conjugation *at* is added; but the following *e* is changed into *a*, as *ateinditenni*—to have compassion upon one's self, or, to have compassion for each other, from *enditenri*—to have pity. These reciprocal verbs most frequently have in relative verbs an infinitive signification, as *atiesen d'atatehiatondi*—it is easy to write back to each other; *d'atatrihsaienstandi*—to instruct one another; in like manner to signify substantives, as *ˌanderon d'atatrihsaienstandi*—instruction is difficult; *teˌaenhsi d'atatakarata'ti*—I know not how to take care of the others.

The deponent are those which may have the passive mark of voice, as *at*; yet an active signification as *atehien*—to commission, from the relative *chienhaten sens*—a physician; from the relative *diˌatsente*, active, to physic; *hatennha*—he commissions, from the relative, *ˌannhandi*, *hatrios*—he fights, from the relative, *ario*—to fight, to kill. *Atanditenri* may signify to have compassion upon another, and also to lament to one's self on account of one's own troubles, to weep over them, from the verb *ˌentenri*—to have pity. Moreover what was said of reciprocal or

passive verbs; the same may be said of words placed in composition whose initials just as if the verbs take *at* or *atat*. Thus from *ˌarihʉa*—a thing, is made *atatrihʉa*, by contraction, for *atateriha*, which, if you put with the verb *ˌannonhʉendi*, it will become *atatrihʉa ienstandi*—to instruct one another, from *ˌaienstandi*.

Of the Pospositions *ti, sti, xʉi.*

These three particles are added to words, to signify sometimes the cause, sometimes the matter, sometimes the formal, or efficient, or final, as will appear by the examples. Moreover, final particles of this sort are not joined promiscuously to any verb; but *ti* is placed after some verbs, *sti* after others, and *xʉi* after others. *Ti* is placed after verbs in the following manner.

1o.—Those whose infinitive in *e* adds *k* to form the present indicative, as *ˌatsiheïne*—to burn a field, from *atsiheïnek*—she burns. Add *ti*, as *atsiheïneti*—to burn with that; thus *ohare*—to wash; *ohareti*—to wash with; *ˌaˌase*—to row; *ˌaˌaseti*—to row with.

2o.—After those whose infinitive in *i* changes that into *ch* in the present, as *ˌarihʉanderaˌi*—to fish; *ˌarihʉanderach*—she fishes; *ˌarihʉanderati*—to fish in that.

3o.—Those ending in *ʉi* and *hʉi*, which in the present is changed into *ch*. *Okakʉi*—to paint; *okach*—she paints; *okati*—to paint with that. *ˌAriho'trahʉi*——to recite; *ˌariho'trach*, *ˌariho'trati*—to recite with that. Except, *asokʉi*—he stands; *asohoti*—to stand with something.

4o.—Those compounded with *ondi*—to do, and *on*—to move, by adding *a* before *ti*, as *ˌachondi*—to do; *ˌachoniati*—to do with that. *Atori*—to startle, to hunt; *ato'rati*—to fly; *ˌator'aθa*—she flies with that. *ˌAnnonhʉarori*—to sing; *annonhʉaroiati*—death song, without.

5o.—*ˌAcʿhiati*—to consume, to finish, and its compounds have *ˌaʿchiati*—to finish, to accomplish, from thence.—*Eϑaondeʿchaʿchiaʿte*—he has ran over all the earth.

6o.—*Atati*—to speak; *ˌatatiak*—I speak; *ˌatatiaϑa*—I speak that language there.

7o.—*Anʿdiri*—that is firm; *ˌanditi*—to strengthen.

8o.—*ˌAio*—to kill; *ˌaioti*—to kill with something.

9o.—Verbs in *andi, endi, indi, ondi,* with the long penult have *ándi, éti,* or *énti, íti, ónti,* as, *ˌannandi, ˌannaʿti* to command; *aentendi*—to know; *ˌaenteʿti*—to know by some sign. But, *eiachendi*—to be angry; *eiachatiʿonnhonˌendi*—to pain; *onnhonˌenti, ˌaienhsendi*—to know; *ˌaenhseti, ˌakerondi*—to be afraid; *aʿkeronti.* Some in *en* take *ati, ateˌen*—to have fire; *ateˌati*—to make fire; *arʿonˌen*—to listen; *arʿonˌati, andaˌen*—to sow; *andaˌati, orahen*—that boils; *ˌaˌhati*—to boil; *ˌanhsaehen*—a bad thing; *ˌarihsʿachate*—to make a thing a bad. *ˌAnnonrʿaˌandennen* to be foolish; *ˌannonʿraˌandendati*—to make a person become foolish; *kaxen*—to be joined together; *kaxati*—to join together, to compare; *ˌataien*—to smoke tobacco; *ˌataiati*—to smoke with something; *ˌaeriken*—to cure one's self with some cure. *ˌAeren*—to make; *ˌaerati*—to make with something; *ˌarannonen*—to be wet; *ˌarannnonasti,* and not *ˌarannonate*—to wet, also from *atonesen*—to thank; *atonesti*—to thank for something; *katen*—to steal; *katensti, ˌahsannhen*—to tie, to bind; *ahsannhasti, andiannhen*—to tie round the finger; *andiannhasti* from *ˌandia*—finger.

10o.—Relative verbs in *senni* take *ti,* as, *eiachasenni*—to hate; *eiachasenniti*—to hate on account of something.

11o.—Acquisitives in *ande, endi, indi, ondi,* with the short penult borrow particles of quality from its primitive derived from the simple by adding to them the final figura-

tive mark of relation which is in *andi*, as, *ate,atandi*—to light a fire for any one, it has recourse to its derivation *ate,ati*, which has *ate,ate'ʁsi*, and by changing *ʁsi* into *ʁsandi*, forms *ate,ata'ʁsandi*—to light a fire for any one from some material; *endihendi*—to borrow from any one; *endihatandi*—to cause that some one borrow from some one, from the primitive *endihati*, *anhʁandera,indi*—to offend any one; *anhʁanderatandi*, *,askarardi*—to spread for some one; *askaronkʁandi*—to spread something for some one.

12o.—Verbs in *ʁan*, *ʁan* and *xʁɪn*, have *ʁa'ti*, *ʁa'ti*, *xʁati*, as, *ateʁan*—to fly; *ateʁati*—to take to flight; *kaʁan*—to take with some one or on account of some one; *,aʁan*—to plunder; *,aʁati*—to plunder on account of or with. Verbs ending in *ti* or *sti* have in the present, *θa*, *sθa*, in the future *t*, *st*, in the future negative, *tandi*, *stande*. Those ending in *ʁsi* have in the present and future *ʁʁa*, in the negative *ʁande*. Some in *on* which for the future is changed into *a* or *i*, take *ati*, as, *,enheon*—to die; *e,enhei*—she will die; *,enheati*, *,a,arennion* to turn aside; *a,arennioti*.

Sti is put after—1o. verbs in *ti* which to form the present indicative is changed into *s*, as *,andaʁati*—to dig; *,andaʁas* she digs, or she digs with that; *'arati*—to lie down; *aras*—she lies down, from thence *arasθa*—she lies upon that, that is, her bed. Except, *atsendi*—to think, which takes, *,ʁsi*, not *ti*, *,atsentaʁsi*, not *,atsenti*, which in the present would have *,atsens*—she thinks.

2o.—To those compounded with *ïo*, signifying magnitude as, *,aʁendis*—the great voice, the mistress; *aʁendiosti*, relative, to take for the mistress. *,Arihʁio*—a thing, a thing of importance; *,arihʁiosti*—to put a thing in condition, to amplify it, exaggerate.

3o.—To some verbs in the present having *ens*, as *ondé-*

a,endi,onrato,ensθa—that is what makes me now; *ondete-tsonto,ensθa*—they unmarry themselves on account of that, also from *atia,e*—to make water; *atiaesθi*—to cause to make water; *,annhaten*—to regret; *annhatensti*—to cause to regret.

Xʊi is put after—1o. verbs whose infinitive is in *a*, as, *,ar'a*—to be above; *,arakʊi*—it is upon that some one is; *or'a*—to be hafted, whence *or'akʊi*—it is then a thing hafted.

2o.—Verbs whose infinitive and present indicative end in *e*, as, *onnhe*—to live; *onnhekʊi*—it is on that we live; *haatate*—he is present; *haatatekʊi*—he is present for that.

3o.—Verbs in *on* whose present indicative is in *onk*, as, *,ahiaton*—to write; *,ahiatonk*—she writes; *,ahiatonkʊi*—to write with that. Except, *,aton*—to be lost; *aton*—to become, saying *iaon*—to arrive, which add *ti* to themselves, not *xʊi*, thus it is said *'atonti*—to mislead some one, not *'atonkʊi*. *Atonto*—to cause to become; *,aonti*—to make a person come in.

4o.—Verbs whose infinitive ends in *t* after which is added *a* before *kʊi*, as, *atrendaent*—to pray; *atrendaentakʊi*—to pray for that; *ahachent*—to hold a council; *,ahachentakʊi*—she holds a council for that.

5o.—Verbs whose present is terminated in *θa*, as, *,aθeθa*—she pounds; *aθeθakʊi*—to pound with that. Two of these particles are sometimes put after the same words, as, *ate,en*—to have fire; *ate,ati*—to make fire, and *ate,atakʊi*—to make fire with something.

Various significations of the particles *ti*, *sti*, *xʊi*.

,Andachiahaeraθa—he does with a knife, from *,a,eren*—to do, the instrumental cause; *ʊendat hatatiaθa*—he speaks Huron, from *,atati*—to speak. The manner is expressed

by *ˌhateˌaθa*—he makes fire, from *ateˌen*—to have fire, again *ondêhateˌaʻθaksa*—he makes fire with that. Whence *θa*, signifies the efficient cause and *ksa* the material.—*Ondêaˌakeronθa*—behold what makes me afraid, the objective cause, *ondêarihsiostaksi*—there is why I believe it, the final cause, *tetiechonniaθa*—where one makes satisfaction, purgatory.

Ti, *θa*, *t*, *tande*—little; *sta*, *st*, with *stande*—little, *sti*, from *ksi*, *ksande*—he denies; *ksa*, present and future.

Besides they signify celerity of action, *aharihiaθa*—he might read immediately; *onsaaˌent*—he went out again immediately, or *ehasenhoati*, *eoonti*—they arrive in a day, from *ˌaon*—to arrive.

They signify also perpetuity, *ehandareksi*—he lives always. *Ehentrontaksi*—he is always, that is at the lodging; *ehonnheksi*—he laughs always. They signify that which is said in French, he goes saying, doing as fast as, &c. as, *ekahiatonʻksande*—he goes writing as fast as one dictates to him. *Orasanehksatontanʻde*—we become better as fast as we do well. Signify that which we say, do this and that, that at once all in are float, by the same journey; *achiatrendaentaʻksanʻde*—you go by the same means to pray to God, (you that is, in a place that is on the other side of the church,) *ahaiatanʻde*—he goes a hunting taking a journey. Those joined to the negative signify impossibility, as, *stanhotirihsiostateˌen*—they will never believe. *Stanharihsanderaθateˌen*—he is not to fish; *stanaˌiheateˌen*—I am not to die; *stanhotrihctiastateˌen*—he is not to listen.

Note.—Also the following, *onnhatenstandi*—a thing worthy of being regretted; *hotanditenstandi*—a man worthy of compassion, from *atanditenri*—to have compassion, to

be merciful; *oteia'chiʉtakʉandi*—a thing that deserves well that we be in trouble about it, from the verb; *ateiache^{ss}t*—to be in trouble. *Aoneskʉat*—an agreeable thing, from the verb, *oneskʉandik*, or *oneskʉan*—to please. *Hʉeiachiat*—an angry man that deserves to be hated, an irritating man, from *eiachendi*—to be in a passion. *Hoskʉahat*—he is bad, worthy of aversion, from *askʉandi*—to have aversion. *ˌAta'k*—a thing to be eaten, from *ˌaˌi*—to eat, and the like which seem to supply particles and other words derived from verbs, as, to be loved, lovely, the Hurons want this and—*onkierihatande*—that which is reasonable, from *onhierihen*—a just thing, a thing concluded as good; *satatanhatan'di*—the fever, from *oatatarihaθa*—she has the fever, and *oatatariken*—she is warm; *atankʉtakʉande*—cold, from *ˌaataindʉsti*—to be cold. *Orikʉanderataneti*—fishing, from the verb, *ˌarihʉandeˌra,i*—to fish. Also the place is signified by particles of this sort, *θohatientakʉa*—he lives there; *etiaʉatsataionkʉa*—we were speaking to one another here within.

Observe from the following examples may be seen that we use *kʉi* not *kʉia*, *ti*, not *θa*, when the place is immoveable *θoston,ʉeiachiontakʉi*—where we have the heart, for the place is immoveable, not depending upon art but upon nature. Thus *askati ˌonadaʉatekʉi*—on the other side of the river; *on'da'onnentakʉi*—where the river descends; *haienhʉitiona'te*—at his right. But when the place depends upon the will of a man, we ought to use *θa*. *sθa* or *kʉa* not *ti*, *sti* or *kʉi*, as, *θoichienhandaθareθa*—it is the place where he visits; *θohe'ieθa*—it is the place where he goes; *θokʉa-ˌencheθa*—to the place where we go for our requisites; *θokʉa'tiaˌesθa*—where we make water.

The third part of grammar—Of Syntax.

The Hurons sometimes add the particle *de* to substantives, which answers to the French *de* or *du*, as, *i,iehsad'onnenha* I carry wheat; *ehasid'annenha*—I bring back wheat; *teyaciend'onnenha*—I have no wheat; *,andeiad'oenta*—it is fine tobacco; *o,arhied'oenta*—it is strong tobacco.

Two substantives joined together are thus expressed, *hechonherihsaran*—Hechon's book, as if it were, Hechon has that book in his power, for *ran*, signifies the master, *,arihsa*—the book, Hechon *hondaon*—Hechon's house or rather Hechon lives there.

The materials of which any thing is composed of is thus rendered, *,a'riotahaoten,annonchia*—stone house, the same that is of stone; *haoten*, which is *ohsistahaotencandakia*—iron knife, or *ohsista a,asetsten*—a metal flagon, from *,aseta*—bottle.

The place from whence any thing is brought, as, French bread, *an'nonhakehaon ,ondataiondi. An asnien*—blanket; *gannen,ehaon,enonhara.* Appellatives are thus expressed, *hatennion,enhakhonenda,er'ati*—the captain of the French, the French have him as captain—Hechon's nephew, *hechonhasenhsaten*—Hechon's brother—This Hechon and he are brothers; *hechonhiataxen*—the enemies of the French, the same French and they fight; *atin'nion-,enhakhontrioch.*

National names are formed from the proper name of the nation by adding *r'onnon*, as from *annouta,e,onnontaeron-nan á Gaio,sen, Gaio,senronnon.* Verbals as love, fear, &c. are expressed by the infinitive, as God hates sin, *dishochiensennik,arihsankera,i*, or by the impersonal, as *dishochiensennik d'anhsanderach*—God hates that we sin, or by the personal, *dishochiensennik d'asaeihsanderach*—God

hates that we sin.

Those derived from adjectives, as beauty, ugliness, riches, are thus rendered, *axinnon hʉed eakʉastis*—we love beauty; *axinnon konʔa d'iea'tachensa*—we despise ugly persons; namely by the impersonal of adjectives, which signify handsome and ugly.

Note.—But as much from adjectives as from verbs are sometimes formed true substantives, as from *ʉk'ao'ta*—a beggar; *ʉkaocha*—beggary. From *hannaendae*—proud; *ˌannaendaecha*—pride; from *ˌahiaton*—to write, *ˌahiatoncha*—writing. *Akʉanr'ai*—to rob; *àkʉanr'acha*—theft, larceny. *Atsir'andi*—to be poor; *ˌasir'acha*—misery; *ˌann'enhʉak*—to have a father-in-law; *ˌann'enʉae'cha ˌa,isten*—to be a father; *ˌa,istenha*—paternity; *andʉen*—to be a mother; *andʉencha*—maternity; from thence *a,ennhʉaeehen*—I have a father-in-law; *a,e,iste'nchen*—I have my father. Sometimes also they form substantives from appellatives, as from *onnhe'tien*—woman; *onnhe'tiencha*—that savours of woman. Some derivatives, whether from substantives or from verbs, are formed by adding *cha*, whence also other verbs are formed, by changing *cha* into *chen*.

The Syntax of substantives with adjectives.

Since some substantives undergo composition, others not at all, a different syntax is to be used. Substantives which are compounded in this, only agree with the adjectives to which they are joined, that they take the nature of their paradigma, as *ˌannonchia*—hut; if it is compounded with *ˌasasti*—beautiful, you say *ˌannonchia'ʉasti*—a beautiful hut, of the paradigma *ch;* because *ʉasti* is of the paradigma *ch;* but if it is compounded with the adjective *ondiri*—strong, you say *onnonchio'ndiri*—a strong hut, of the paradigma *s*, because *ondiri* is of the paradigma *s*.

Substantives which are not compounded in number, gender, and person, agree with their adjective, *atieronkʂa*—robust; if it adheres to the substantive *hern'diahaon*—a male, you say *hatie'ronkʂa*, with the initial *h*, which is the mark of the third person masculine; but if the word *onnhe'tien* be the subject of the predicate, you say *atieronkʂa* without *h*, because it is the third person singular feminine. If you wish to express in Huron, thou art a strong woman, you say *chiatieronkʂa de sannhetien*, the substantive agreeing with the adjective as to person, not as to paradigma. *Chiatieronkʂa de chion,ʂe*—thou art a strong man.

Note.—That when with one single substantive capable of composition, are joined two words, of which the one is an adjective, the other a verb, that it is compounded with both separately, as, I have found a fine hut, the word *,annonchia*—hut, is twice used and joined both to the verb *orendi*—to find, and *,ʂasti*—fine; thus, *,ann'onchia ʂasti ,ann'onchiorendi*. Thus, thou hast a fine knife—*,andahiaʂa'sti sandahien*.

Note 2o.—That when a substantive cannot enter into composition with an adjective which is applied to itself, often the generic name of the same substantive is put with that adjective; as, a fine oak—*,ar'ontaʂa'sti ,ero'hi*, where we take the name of the kind, and *,aronta*—a tree, which we join with *,ʂasti*—fine, and then we add *,ero'he*—oak. Thus, an ugly child—*haatachen d'achiaha*, or, *,aata*—animal, is joined with *,achen*—ugly, because *achiaha*—infant, is not compounded.

Some things are to be observed in the composition of a substantive with adjectives and verbs.

1o.—The substantive always goes before.

2o.—The last vowel of a substantive perishes, and the

consonant of the adjective or verb, which is initial, is struck out.

3o.—A substantive follows the nature of the adjective or verb as to the paradigma, not as to conjugation, as, *enta'* —a day, whether it is compounded with the verb *ˌavan*—to belong, or the verb *ondi*—to do, it is always of the third conjugation; that which has *ˌavan* is of the second, and *ondi* is of the fifth; but because *ˌavan* is of the paradigma *s*, and *ondi* of the paradigma *ch*; therefore *enta* joined *ˌavan* is conjugated like the paradigma *s*, and is joined to the verb *ondi*, inflected like the paradigma *ch*.

4o.—If an adjective taken out of composition begins with another vowel than that which is proper to the infinitive of its own conjugation, then that it may be properly restored to composition with the proceeding substantitive, it ought to take the vowel proper to the infinitive of its own conjugation, as, *on'diri*—strong, of the second conjugation; that it may be compounded with a substantive, it ought to change the initial *on* into *an*, as, *onnonchia'ndiri*—a strong hut, but not *annonchiondiri*.

5o.—Words of the third conjugation when they undergo composition in place of the initial of the nifinitive take the third person singular of the paradigma *s*, as, *hokaochaseichiat*—the angry beggar, from *okaocha*—beggars, and *erachiat*—angry. Thus, *ha'atasendi*—something has happened to him, from *ˌaataasendendi*—to arrive. In like manner, *tsaonhsentsasentondi*——the country is repeopled, from *onhsenha*—country, and *entondi*—to encrease.

6o.—Many verbs when compounded with a double vowel change the first vowel into *i*, as, *ˌaa,i*—to cut; if it is compounded with *ˌaenta*—a stick, is *ˌaentiˌi*—to cut a stick, not *ˌaentaaˌi*.

7o.—Sometimes a double or triple vowel is thrown out in a substantive, as, *ˌarihiaˌi*—to tear a paper, a book, for *ˌarisiaˌi*. Thus, *orihierihen*—the affair is concluded, for *orihsinhen*—from *ˌankva*, *ˌaaˌi*, and *ˌaenhen*.

8o.—Contractions of one or more syllables are often made, as, *haakvasti*—he is handsome, for *haatavaʿsti*.—Thus, *ˌannonskveˌi*—a hut shut, for *ˌannonʿchiaveˌi*. Also, *hiennonsteˌen*—they have their huts near one another, for *tehiennonchiandeˌen*, from *ˌannonchia* and *andeˌenhoaeʿte*—he carries a bag, for *horaaeʿteˌaara*—a bag in composition, out of composition, *ˌannenhsan*. *Ondeʿchen* for *ondʿechaen*—there is a farm.

9o.—A verb is not compounded with another verb or with an adjective, as, I look at the writing, you do not say, *akensahiaton*, but *ˌehiatonchaˌenk* or *atehiatonchakensek*. *Akense*—to look, requires the passive in composition.

10o.—There are some verbs requiring the passive voice in nouns joined to them as *atiahetati*—to load one's self with a bag, from *ˌaara*—bag, and *ˌaˌeti*. *Atondechataksan* to make the round of the earth. *Ennonchionˌotanʿnen*—to walk round the hut; *kvatiatatonˌ*—to surround some one; *kvenditioʿkvaton*—to surround a gang; *aßonennendatatonˌ*—they have beseiged the town.

Of comparatives and superlatives.

We must use circumlocution to express the comparative and superlative, thus, Hechon is more liberal than you, also Hechon is liberal, you are stingy, Hechon, *honvesen, isas annonste*, or Hechon is liberal, thou art not so.—Hechon, *honvesen, stante chionvesen desa*. Hechon is larger than you, also Hechon is large, you are little—Hechon *haˌvanne, isa sakenie*, or Hechon *haˌvanne, stante chiaˌvannedesa*. Also Hechon is the most liberal of the

French, all the French are not liberal, Hechon only is so. *Stante hennönsesen hatiseti d'hatinnionenhak, haonhya* or *hönsesenhechon*—or the French are stingy, Hechon alone is liberal; *hotinnonste d'hatinnionenhak, haonhsahönsesen hechon,* or rather all the ecclesiastics are liberal, but Hechon is so above all; *hatiseti hennonsesen d'hatit si hen-statsi önekichien chiaat,* and *sondera'ti de hechon.* Also the superlative is expressed very well by particles, *araiboti,* or *araibochien* joined to an adjective, as, *araibotia,ondi,on'a-chens*—we are very sad.

Of prepositions.

From Huron particles which answer to prepositions in Latin some put before, others after. Of those which are put before some are separable, as, *eta',e*—beneath; *achasi*—above, upward—others inseperable, as,

1o.—*S,* which we call a particle of repitition, unity and excess.

2o.—*T,* which is the mark of distance of time or place.

3o.—*Te,* the affirmative of duality, division or perpetuity and totality, &c. *To, at, in,* are expressed by some one of the absolute particles, *,e, ke, ske, nde.* In words ending in *t* or *k, ke* is put after in place of the said letters, as, *stentske*—at; *handotonk a,atonnhatake*—at the end of my life; *,ah'achenke*—during the council; *orihsentandi,e*—at the end of the affair. With those ending in *s* or *ch,* in place of these is put; *skeandachiake*—at; *andachiach's.*—In other words having other terminations, at one time *,e* at another *nde* is put after them, as, *hechonde, onden'de, onsasatatronsandi,e*—in confession. To the four questions of place, where, whence, whither and which way, it is answered in the same manner by that final, *,andata,e ex,* as, *an'nenihentron*—where is he? *,andata,e*—he is in the vil-

lage; *ann'entontar'e*—whence comes he? *ˌandata,e*—from the village; *Annena'retan'de*—where does he go? *andata,e*—to the village; *ann'enar'endi*—by which way has he gone? *ˌandata,e*—by the village. By the same particles are often expressed under, within, above, as, *ˌannenhsanˌeisai*—that is in the bag; *ˌannonchia,ei,an'a*—on top of the hut; *asen,ea,oha*—that has just fallen into the water; *ˌatsesta,eaontaha*—that has fallen into the fire; *onden'dealentrontaha*—he reposes on land. The same particles are affixed to names of things which are numbered, as, *tesenta,e*—two days; *ashinkasenta,e*—three days; *ndaki,annon'nske*—four huts, for *i,annonchia,e; asenio,a'ke*—ten stitches, for *io,ara,e*—within, inside; *ˌanda,on*, without composition *ˌaon*, in composition, as, *chiata,on* or *chieskwa,on*—in your belly; *annona,on*—under water, in the bottom of the water; *ˌarha,on*—in the wood; *ˌannonskon* for *ˌannonchia,on*—in the house. When, *a,on* requires the paradigma *s*, it signifies vacuity, as, *a,onnondé*—that is empty, but we say *asetá,oni,o*—there is some liquour in the gourd. Without *he,enk* beyond *chi*, as, *chihotannhon,annondi*—he was determined to that before we spoke to him of it.—Before and in preference to *chi*, as *chihentron*—he is before all ages; *chiaia,ehie'raha* or *ndherenaontaia,ehier'aha*—he must beware; *chie,ontontona'ti*—before you; *aondechenhaon ehatien*—he is from all eternity; *ondêeharontio* or *ehasendio*—he is lord above others, (a name); *ehaatsinnen*—he was called before, (naming him); *ondé d'ehechon*—he that was called Hechon; *ehonnontio*—the former governor; *ondeekwa,en*—this I have before said; *stanteksurandinnen*—I was unwilling before. *Chi*—beyond, as, *chi,a'ndasati*—beyond the river; *ˌaro*—on this side, as, *ˌaroa,an'dasati*—on this side the river.

Tiskehen—near; *ontaonriohe*—I am on the point of being killed; *onta,iheonchiæ*—I am going to die; *ti,andatata*—near the town; *ti,annonchiata*—near the hut.—*Stantioskehente, arihwate*—there is no likelihood of such a thing happening; *tioskehenichie de chrihwiost*—thou wilt soon believe; *chi*—at a distance; *,annenehaatate d'ihwiost*—he is far from believing; *nderenekatede,arihweosti*—faith is very far from him; *tachitsokar'at'ati*—she kept that no more a long time since. *Ata*, final, about, as, *,andawatatie*—along the river; *annentratatie*—along the shore. In the middle *teondo,en, akanho,enhatie satiendaen*—pray to God between two. After and afterwards, *d'aweskwak*—after, afterwards, behind; *aoskwa,teskachitenhwis skon,wati d'aweskwakhaon*—thou wilt bring me a hind foot of elk of the left side; *sehwen echiaraskwa*—thou wilt go after; *,echio,atenk* behind me; *sehwende,ihei*—after my death, (name); *andiare e'saon*—after N shall have returned; *ona'ti*—towards; *,andawate'kwionati*—towards the river, on the side that looks to the river; *,ondataenta'kwionati*—on the side where the town is; *tewatoxw'aa onati*—towards the west; *rakwatona'ti* towards the east; *entrekona'ti*—towards the south; *asihi'seona'ti*—towards the north; *chietenhwitiona'ti*—to the right, towards thy right side; *hoichienetiewendrakwiannien,e*—we are of the side of; *anne,ronnons*—we are for them; *hoea,wetonta,ann'rontie*—we are going to the side of the year.

Under, or beneath—*e'ta'e*; above, within—*,anda,on*; under ground, in hell—*onde'chon ,enonharo ,ennen*; under the the blanket—*,ahwen,aro,ennen hota'se'ti*; he has hid himself under the table—*chie,annen etiorannen ta,i*—that is much below in matter of price; above, upwards—*achawi*; *endicha,ei,ara*—that is upon the sideboard; *hechon akout-*

ennonnen, or, *ahoatannouhscha*—the lot has fallen to Hechon.

Of from; *ˌandataˌe tontaˌe*—I come from the village; *ˌanniohake haon*—from France; *ahsendoˌe*—from England; *hechonˌe eksaˌiaˌen dinnen*—I had come from Hechon's house. As to how much, *ˌandaksaˌe haon;* as to the impurity, *ˌandaksaˌe atiaondi ˌienten*—as to impurity, I know not what it is; *hechonde*—as to Hechon, where is he?

Until *eˌiheiθa esarihsios tihatie*—I will preserve faith until death. Up to, *ehiate ennontetsi ioʻndste*—there is water up to my leg; *θo ioʻndste ti eʻndiasont*—as far as the neck; *tate eátiaˌi ionʻdste*—water up to the middle.

Without, *oˌon nondaie*—that is without any mixture.—*Oskenaˌon, sagennité*—without fish, without seasoning; *aondechon* for *aondechaˌon*—country without people; *teˌaatra nondeé*—without that, or, that is not; *stante esenditi*—we will do without you.

With, *onde teandi aekse*—come with us; *ondé asentenhaon iʻndes*—he goes always with him.

Before, *techie, anʻrak*, or *chieˌatak*, or *chiatrak*, or *chitontak*—you seeing or being present.

With the knowledge of, *oˌonˌe ahente*—that is in the sight of all.

Without the knowledge of, *ˌandaˌon*, or *otaseʻtiˌe hosasennen hatie*—he goes in secret; *hatsahʻon kseindeθa*—he speaks in secret, according to custom; *oentendi*, or, *aʻoht*, or, *eˌenʻtakse*—that is usual; *ahasendsten*—it is his manner of speaking; *ahaiendsten*—it is his manner of doing; *endihaˌechenniandik*—he works for me.

From, *annionhakehaon*—from France; *isoʻonhaon*, or, *tisoon*—since he has arrived; *ˌennhiekhaon*—since last year; *tesentaˌe eksaˌeˌinnen*—I have not eaten for two days.

Against is expressed by the word *ha¸eskwahens*—he is against me; *harasennik*—he is for me, that is, of my opinion; *ha¸er'esaŋa*, or, *ha¸enda'chiodaŋa*—he is not of my opinion, he reproves me, he contradicts me.

For, is not expressed but by the words *onde*, *aondi*—it is for that; *sonhwaachierhon*—it is for the love of you; *saraskwasen ta'itenr*—go, I pray you, do that for my sake. Why hast thou come hither? because I said I would come—*ondé aondi ¸aro etsise'ti stisa¸en ¸ao aset, onde xaio' ti*, or *onde io'ti*—it is for that.

DISSERTATION *sur le* CANON DE BRONZE *trouvé en* 1826 *sur un banc de sable, dans le Fleuve Saint Laurent, au devant de la paroisse Champlain, District des Trois Rivières, par* AMABLE BERTHELOT, *Ecr.*

JE divise cette Dissertation en deux parties. Dans la première j'entreprends de prouver que Jacques Cartier n'a pas fait naufrage sur la roche de Jacques Cartier. Dans la seconde je conjecture que ce canon a appartenu à Vérazani.

Mr. Neilson, dans sa Gazette de Québec du 23 Avril, 1827, annonce que Mr. Chasseur a dans son Musée un canon de bronze d'une forme extraordinaire, qui a été trouvé, l'automne 1826, à l'embouchure de la rivière Jacques Cartier. Charlevoix ayant dit que c'était, dans le pays, une tradition que Jacques Cartier avait perdu un

de ses vaisseaux en cet endroit, on en a conclu que ce canon avait appartenu à ce vaisseau. L'inscription gravée depuis sur ce canon l'explique ainsi. Observons d'abord que ce n'est pas à la rivière Jacques Cartier que ce canon a été trouvé. Mr. Colin Campbell, qui en a fait présent à Mr. Wood, informa Mr. Chasseur le 28 Juillet 1828, que c'était sur un banc de sable, vis-à-vis de la paroisse Champlain, qu'il avait trouvé cette pièce. Ce canon peut être un grand témoin; nous l'interrogerons. Commençons par en faire la description.

Cette pièce a une ouverture à la partie supérieure de la culasse, dans laquelle on place une chambre mobile, destinée à contenir la charge. Cette chambre est fixée par une cheville de fer; l'âme ou l'ouverture du canon a trois pouces de diamètre; l'ouverture de la chambre mobile, ou du cylindre destiné à contenir la charge, est d'un pouce et demi; la longueur de la pièce est de trois pieds quatre pouces et demi; la longueur du levier en fer, placé à la culasse, au lieu du bouton, pour pointer la pièce, est de dix pouces trois quarts mesure française. Ce canon est fixé sur une chandelle qui se divise en deux branches comme sont en général les pierriers; le fer en est profondément rongé par la rouille. Cette pièce est d'un très beau métal, mais elle est si irrégulièrement formée, en comparaison des canons de bronze que nous voyons de nos jours, qu'il parait évident qu'elle appartient à l'enfance de l'art de la fonderie des canons.

Première Partie.—Champlain dit que le 3 Juillet 1608, il arriva à Québec, où il chercha un lieu propre pour son habitation. Que proche de ce lieu est une rivière agréable, où anciennement hiverna Jacques Cartier. C'est aussi l'opinion de La Potherie qui était à Québec en 1698.—

Cependant il parle comme Charlevoix d'un naufrage de Cartier, sur la roche de Jacques Cartier.

Charlevoix dit, que de l'ile de Bacchus, ou d'Orleans, Cartier se rendit dans une petite rivière qui en est éloignée de dix lieues, et qui vient du Nord : il la nomma rivière Ste. Croix, par ce qu'il y arriva le 14 Sepembre 1535, (après beaucoup de difficultés de la part des Sauvages comme nous le verrons ci-après,) il partit de Ste. Croix le 19, avec la grande Hermine seule et deux chaloupes, laissant les deux autres navires dans la rivière Ste. Croix, où la grande Hermine n'avait pu entrer. Dans une note il ajoute, " Champlain dit que cette rivière est celle de St. " Charles : mais il se trompe, puisque des bâtimens beau- " coup plus grands que la grande Hermine entrent fort " bien dans celle-ci, quand la marée est haute. C'est qu'il " comptait les dix lieues du bas de l'Isle. Je trouve dans " quelques mémoires, et c'est une tradition constante en " Canada, qu'un des trois navires fut brisé contre un rocher, " qui est dans le fleuve St. Laurent, vis-à-vis de la rivière " Ste. Croix, et que la marée couvre entièrement lors- " qu'elle est haute, mais la relation d'où je tire ce récit ne " dit rien de cet accident." Dans une autre note il ajoute, cette roche s'appelle encore présentement la roche de Jacques Cartier.

Charlevoix reproche à Champlain de n'avoir pas bien compris le récit de Jacques Cartier. Voyons d'abord ce récit, après quoi nous tacherons d'apprécier la traditon.— Consultons Lescarbot. Cet écrivain, d'après ce qu'en dit Charlevoix, dans sa liste des auteurs sur l'histoire de La Nouvelle France, parait sincère, bien instruit et impartial. Lescarbot copie le récit du second voyage de Jacques Quartier, (que nous écrivons maintenant Cartier,) de

l'original présenté au Roi, écrit à la main, et couvert en satin bleu. A la page 268 it dit que d'abord il avait résolu de ne donner qu'un abrégé de ce voyage, mais que pour l'avantage des navigateurs il le donne en son entier. En effet la différence du style de Cartier et de Lescarbot est très sensible, et en plusieurs endroits Lescarbot explique des expressions de Cartier qui avaient déjà vieilli de son temps. Lescarbot après avoir rapporté la découverte que Cartier fit de l'Ile aux Coudres le 6 Septembre 1535, le 7 il l'en fait partir et le fait arriver à quatre iles distantes de l'Ile aux Coudres de sept à huit lieues, " desquelles (dit-il) " il y en a une grande, environ dix lieues de long et cinq " de large. Le 8 Septembre le dit capitaine fit apporter " nos barques pour passer outre, et aller à mont le dit " fleuve avec le flot pour chercher hable et lieu de sauveté " pour mettre les navires, et fumes outre le dit fleuve " environ dix lieues cotoyant la dite Isle, et au bout d'icelle " trouvâmes un affourc d'eau fort beau et plaisant, au quel " lieu il y a une petite rivière, et hable de barre marinant " de deux à trois brasses, que trouvames lieu à nous pro- " pice pour mettre nos dits navires à sauveté. Nous nom- " mames le dit lieu Ste. Croix, parce que le dit jour y " arrivâmes—après avoir visité le dit lieu, et trouvé être " convenable, se retira le dit capitaine et les autres " dedans les barques pour retourner aux navires."

L'escarbot dit dans une note en marge " hable de barre" c'est-à-dire, hâvre qui assèche de basse mer. Il faut que le mot *affourc* ou *affourq* fut encore familier de son temps, puisqu'il ne le définit pas ; mais il est hors d'usage aujourd'hui; fourque et forcat sont des termes de marine de nos jours, l'homonymie dit à une oreille française que l'on entendait du temps de Cartier par le mot fourc ce que nous

entendons de nos jours par celui de fourche : ce qui correspond parfaitement à la fourche d'eau que présentent à la vue le hâvre de la rivière St. Charles et le fleuve St. Laurent entre Québec et la pointe Lévi, lorsque l'on entre dans le bassin de Québec par le chenal du Nord de l'Ile d'Orléans. Ces expressions de Cartier ne peuvent certainement pas s'appliquer à l'entrée de la rivière Jacques Cartier. Quant au mot *marinant* il faut supposer qu'il était très familier du temps de Lescarbot puisqu'il n'en donne pas la définition, mais dans la circonstance où il le place il exprime indubitablement le mouvement de l'eau pendant le reflux.

Cartier de retour à ses navires, visite cette Ile qu'il estime avoir environ douze lieues de longueur. Il la nomma Ile de Bacchus à raison des vignes qu'il y trouva, et Lescarbot dit dans une note marginale que c'est l'Ile d'Orléans.— Cartier se rendit ensuite avec ses navires " au dit lieu de " Ste. Croix, le 14 Septembre. Le seizième du dit mois " nous mimes nos deux plus grands navires dans le dit " hable et rivière, où il y a de pleine mer trois brasses, et " de basse eau demie brasse, et fut laissé le gallion dedans " la rade pour mener à Hochelaga." Ce gallion était l'Emérillon du port d'environ 40 tonneaux. Les deux autres vaisseaux étaient la grande Hermine d'environ 120 tonneaux, et la petite Hermine d'environ 60. Le 19 Cartier part pour Hochelaga, depuis nommé Montréal, avec le *gallion* et deux barques. Au lac St. Pierre il laisse le *gallion,* parce que dit-il il n'y avait pas assez d'eau ; mais il nous est permis de croire que c'est parce qu'il n'en connaissait pas le chenal. Il poursuit sa route avec ses barques et se rend à Hochelaga. Le 4 Octobre il revient au lac St. Pierre avec ses barques et y retrouve son gallion. Le 5 il en part avec le gallion et ses barques, et Cartier ajoute

" Le lundi onzième jour d'Octobre nous arrivâmes au hable " de Ste. Croix, où étaient nos navires, et trouvames que " les maitres et mariniers qui y étoient demeurés avoient " fait un fort devant les dits navires tous clos de grosses " pièces de bois plantées de bout joignant les unes aux " autres, et tout à l'entour garni d'artillerie"—Cartier ajoute " il y a aussi ès environs du dit Canada, dedans le " dit fleuve plusieurs Iles tant grandes que petites. Et " entre autres il y en a une qui contient plus de dix lieues " de long, laquelle est pleine de beaux arbres, et force " vignes. Il y a passage des deux côtés d'icelle; le meil- " leur et le plus sur est du côté devers le sud, et au bout " d'icelle ile vers l'ouest y a un affourq d'eau bel et délec- " table pour mettre navires: auquel y a un détroit du dit " fleuve courant et profond, mais il n'a de large qu'environ " un tiers de lieue: le travers duquel y a une terre double " de bonne hauteur toute labourée, aussi bonne qu'il soit " possible de voir. Et là est la ville et demeurance du " Seigneur Donnacona et de nos hommes" (deux sauvages qui ne voulurent pas suivre Cartier à Hochelaga) " qu'a- " vions prins le premier voyage: la quelle demeurance " se nomme Stadaconé. Et auparavant qu'arriver au dit " lieu y a quatre peuples y demeurant, sçavoir, Ajaouasté, " Starnatam, Tailla, qui est sur une montagne, et Stadin, " puis le dit Stadaconé, sous la quelle haute terre vers le " nord est la rivière et hable de Ste. Croix: auquel lieu " avons été depuis le quinzième jour de Septembre jus- " qu'au sixième jour de Mai mil cinq cent trente six: " auquel lieu les navires demeurerent à sec, comme cy- " devant est dit."

Vient ensuite le récit de ce qui se passa pendant l'hiver; du scorbut dont les Français furent attaqués. Sur cent dix

il n'y en avait que trois ou quatre de sains. Vingt-cinq moururent et furent cachés sous la neige : et afin que les sauvages ne s'apperçussent pas de l'état déplorable des équipages, Cartier défendait aux sauvages l'accès aux vaisseaux, et lorsqu'ils en approchaient, on y faisait le plus de bruit qu'il était possible, pour leur faire accroire que tout le monde était en ouvrage. Donnagaya indiqua à Cartier un arbre avec lequel il s'était guéri lui même, car la même maladie s'était répandue parmi les sauvages.— Charlevoix dit que cet arbre est l'épinette blanche.— Approche enfin le temps du départ. Voici le texte de la relation. " Ce que nous était de nécessité : car nous étions " affoiblis, tant de maladies, que de nos gens morts, qu'il " nous fallut laisser un de nos navires au dit lieu de Ste. " Croix." Ensuite Cartier dit que ce navire fut abandonné a ceux de Stadin pour en avoir les vieux cloux. Vient enfin le départ. " Le Samedi sixième jour de Mai nous " appareillames du havre de Ste. Croix, et vîmmes poser " au bas de l'Ile d'Orléans environ douze lieues du dite Ste. " Croix." On voit de plus que Cartier avait ramené en France le petit gallion appelé l'Emérillon, dans lequel il n'était allé que jusqu'au lac St. Pierre.

Qui d'après ce récit fait au Roi par Jacques Cartier peut avoir le moindre doute que ce Capitaine n'ait passé l'hiver de 1535 et 1536 dans la rivière St. Charles, située au nord de Québec, qu'il n'ait été à Hochelaga, ou Montréal, qu'il n'en soit revenu dans l'Emérillon depuis le lac St. Pierre sans accident, et que s'il laissa un de ses vaisseaux à Ste. Croix dans le hâvre de la rivière St. Charles ce fut, non pour l'avoir perdu sur la roche de Jacques Cartier, mais à raison de la foiblesse de ses équipages : que quand il dit qu'il laissa ce vaisseau pour que ceux de Stadin en eussent

les vieux cloux il n'en avait pas enlevé tous les canons, les agrès et autres choses qu'il lui importait de prendre. Quel intérêt pouvait il avoir de déguiser le vérité quand tant de témoins oculaires pouvaient le démentir et le perdre.

Maintenant examinons de quel poids peut être la tradition dont parle Charlevoix. Cette tradition en Canada n'a pu être transmise par des Européens, depuis 1536 après le départ de Cartier, jusqu'en 1608 que Champlain s'établit à Québec. S'il y eut une telle tradition, elle n'a pu parvenir que par des sauvages des environs. Champlain ne se rendit sur les lieux parcourus par Cartier, qu'environ 72 ans après. Charlevoix n'alla à Québec que vers 1720; c'est-à-dire, environ 180 ans après Cartier. Lequel des deux pouvait le mieux être guidé par les traditions des sauvages? Champlain était contemporain de Lescarbot: revêtu comme il était de la commission de fonder une colonie sur les bords du fleuve St. Laurent, peut-on supposer qu'il n'ait pas eu accès à la relation du second voyage de Cartier, aussi bien que Lescarbot. On doit penser que Champlain a suivi les traces de Cartier. De plus Champlain a pu voir plusieurs sauvages qui lui ont dit avoir vu des hommes de son espèce, blancs et barbus, hiverner au nord de Québec, c'est-à-dire, à la rivière St. Charles. Ainsi Champlain doit avoir fondé son opinion et sur le récit de Cartier qui est très explicite, et peut être aussi sur le rapport de vieux sauvages, témoins oculaires du séjour de Cartier à la rivière St. Charles. Il est bien clair que Charlevoix s'est trompé en disant que Cartier partit pour Hochelaga dans la Grande Hermine.— Le passage ci-dessus de Cartier dit positivement la contraire. Il ne cite qu'en gros des mémoires et une tradition qu'on lui a rapportée en Canada, pour prouver que Cartier a perdue un vaisseau sur la roche qui se trouve vis-à-vis sa

prétendue Ste. Croix. Mais il déclare lui même qu'il ne trouverien de cela dans les mémoires sur les quels il nous donne le second voyage de Cartier. Ce fait, encore une fois, ne peut avoir été transmis que par le récit des sauvages des environs. Lorsque Champlain fonda Québec, il y avait déjà 72 ans que Cartier avait fait son second voyage sur le fleuve St. Laurent. Plusieurs années se passèrent avant que le Canada eut des missionnaires ou des Français capables de converser avec des sauvages, et avant que des sauvages eussent appris le Français assez bien pour s'expliquer clairement. Ainsi en admettant cette tradition comme vraie en général, j'ai le droit de dire qu'elle n'est pas applicable à Jacques Cartier, puisque sa relation dit positivement le contraire. Qui niera qu'un fait vrai, ne puisse, en très peu d'années, être surchargé de circonstances étrangères. N'est-ce pas ce qui arrive tous les jours. On ne me persuadera jamais qu'au bout d'environ un siecle qui dut s'écouler avant le récit de ce naufrage, les Sauvages eussent conversé le nom de Jacques Cartier. Tout le monde connait leur habitude de donner des noms de leur propre langue aux étrangers, par la raison qu'il est plus facile de se souvenir d'un mot familier que d'un mot étranger. Ce ne fut que de cette manière qu'ils désignèrent ceux qui firent naufrage sur le fleuve St. Laurent. Ils ne purent après tant d'années indiquer l'époque d'un naufrage que d'une manière vague, mais peut-être qu'ils la désignèrent d'une manière à faire soupçonner qu'il pouvait s'agir de Jacques Cartier. En Canada on crut à ce naufrage d'un des vaisseaux de ce capitaine parce qu'il n'était retourné en France qu'avec deux vaisseaux. Et faute de pouvoir consulter son second voyage, qui parait n'avoir jamais été publié en Français, que par Lescarbot

on aura cru que cette rivière que nous appelons Jacques Cartier est la rivière où il hiverna et que ce fut lui qui y fit naufrage.

SECONDE PARTIE.—Je crois que l'on doit regarder comme certain qu'un vaisseau, avant le second voyage de Jacques Cartier, a fait naufrage dans le fleuve St. Laurent. Mais voyons s'il est permis de faire une conjecture et de lier l'idée de ce naufrage au voyage de Verazani, qui me parait être dans ces tems, le seul voyageur malheureux auquel se rattache ce naufrage.

Charlevoix dit que Verazani étant au service de François I, après avoir fait en 1523 un voyage pour découvrir l'Amérique Septentrionale revint à Dieppe; qu'il en sortit en 1524, pour aller en course contre les Espagnols; que Verazani découvrit l'ile de Terreneuve, où les Bretons faisaient la pêche long-temps avant 1525. Que peu de temps après son arrivée à Dieppe, il fit un nouvel armement à dessein d'établir une colonie dans l'Amérique. "Tout "ce qu'on sait de cette entreprise (dit Charlevoix) c'est "que s'étant embarqué il n'a point paru depuis, et qu'on "n'a jamais bien su ce qu'il était devenu: car je ne trouve "aucun fondement à ce que quelques uns ont publié, "qu'ayant mis pied à terre dans un endroit où il voulait "bâtir un fort, les sauvages se jeterent sur lui, le mas-"sacrèrent avec tous ses gens et le mangèrent."

Lescarbot nous met un peu plus sur la route, en nous disant "Quelqu'un dit qu'étant parvenu au Cap Breton "*qui est l'entrée pour cingler vers la grande riviere de* "*Canada*) il fut pris et dévoré des sauvages. Ce que dif-"ficilement puise-je croire, puisqu'il fit la relation susdite "de son voyage au Roi," (c'est-à-dire, d'un voyage an-"térieur) "et attendu que les sauvages de cette terre là

" ne sont point antropophages et se contentent d'enlever la " tête de leur ennemi. Bien est vrai que plus avant vers " le nord il y a quelques nations farouches qui guerroyent " perpétuellement nos mariniers faisant leur pêcherie.— " Mais j'entends que la querelle n'est pas si vieille, ains " est depuis vingt ans seulement que les Maloins tuerènt " une femme d'un capitaine, et n'en est point encore la " vengeance assouvie. Car tous ces peuples barbares " généralement appètent la vengeance, laquelle ils n'ou- " blient jamais ains en laissent la mémaire à leurs enfans."

Ici Charlevoix rejète ce genre de mort de Verazani, faute de preuves, mais considérons qu'en ce cas nous sommes réduits à de simples conjectures. Il n'est point si difficile lorsqu'il nous dit que la riviére Ste. Croix où hiverna Cartier, est la même que celle que nous appelons maintenant Jacques Cartier, sans autre preuve que la tradition dont nous avons parlé. A bien peser ce que disent ces auteurs, le doute serait si les Sauvages enlevèrent la tête de Verazani et de ses gens ou s'ils les dévorèrent. Ce que l'histoire nous a appris depuis cette époque, nous prouve qu'ils étaient également capables del'un et de l'autre. Le genre de mort de Verazani est caché dans la nuit des temps. N'aurait il pas pu périr par le Scorbut avec son équipage ? Il pourpait aussi se faire que Verazani et son équipage affoiblis par le scorbut auraient été les victimes de la colère ou de la cupidité des Sauvages, et le second voyage de Cartier nous fait voir les appréhensions où il était qu'un semblable malheur ne lui arrivât.

Examinons quelques autres autorités sur le sort de Verazani.

Lescarbot dit que l'objet de Cartier était de continuer les découvertes de Verazani dans le dessein de fonder des colonies en Amérique.

Lahontan, qui était à Quebec en 1683, dit que Vérazan, ou Vérazani fut le premier qui découvrit le Canada, mais à son malheur, car les sauvages le mangèrent. Remarquons que La Hontan vécut plusieurs années parmi les sauvages et qu'il apprit leurs langues. La Potherie qui était en Canada en 1698, dit que Jacques Cartier fut plus heureux que Verazani, ce qui revient à peu près à la même chose; cet écrivain a vécu plusieurs années en Canada.

Le Beau qui vint en Canada en 1729, en parlant de la découverte du Canada, dit que Verazani, natif de Florence, en prit possession au nom de François I. Qu'il eut le malheur d'y être mangé par les sauvages sans avoir été aussi avant que Cartier qui alla jusqu'à Montréal. Le Beau ne dit point sur quelle autorité il fonde cette opinion, mais comme il passa plus d'une année chez les R. R. P. P. Récollets de Québec, qui furent le premiers Missionnaires de ce pays, il me parait probable qu'il tenait d'eux cette opinion.

Dans quelle partie du fleuve St Laurent Verazani périt-il? J'ai des autorités à produire pour soutenir ma conjecture que ce fut plus haut que Stadaconé ou Québec, et moins haut que Hochelaga ou Montréal.

Le Beau que je ne puis m'empêcher de considérer comme nous transmettant la meilleure tradition sur cette question, vient de nous dire que Verazani n'alla pas aussi avant dans le Canada que Cartier qui alla jusqu'a Montréal. Par ces expressions je conçois que Verazani remonta le fleuve St. Laurent assez haut pour être jusqu'à un certain point un objet de comparaison avec Cartier. Que le lecteur veuille bien se rappeler qu'une tradition bien constatée affirme qu'un vaisseau fit naufrage sur la roche de J. Cartier, et que j'ai prouvé que ce vaisseau n'était pas un des trois de

Cartier. Les deux sauvages qui ne voulurent pas accompagner Cartier dans son voyage à Hochelaga ou Montréal, étaient Taiguragni et Domagaya habitans de Stadaconé ou du promontoire de Québec, lesquels Cartier avait emmenés en France dans son voyage de l'année précédente à l'embouchure du fleuve St. Laurent, et qu'il ramena en 1535, à la plus grande satisfaction de leurs compatriotes. On peut juger du peu de progrès qu'ils durent faire dans la langue francaise. Leurs expressions ne devaient guère s'étendre au délà des premiers besoins de la vie. Solicité par Cartier de monter à Hochelaga " fut par Taiguragni " dit au dit capitaine, que le dit seigneur (Donnacona, chef " de Stadaconé) ne voulait point que lui qui parlait *allant* " *avec lui*, comme il avait promis, *parce que la rivière ne* " *valait rien*." (C'est une façon de parler des sauvages, " pour dire qu'elle est dangereuse, comme de vérite elle " est passé le lieu de Ste. Croix.")

Cherchons maintenant quelle pouvait être la raison pour laquelle Donnacona, Taiguragni et Domagaya s'opposaient à l'exploration du fleuve Saint Laurent au-dessus de Stadaconé ou de Québec. Lescarbot ne peut dire pourquoi ces sauvages ne voulaient pas que Cartier allât à Hochelaga.— " Néanmoins (dit-il) je pense que c'étaient leurs ennemis, " et pour ce n'avaient point ce voyage agréable: ou bien " ils craignaient que le dit capitaine ne les abandonnât et " qu'il n'allât demeurer à Hochelaga." Revenons au récit de Cartier, ce récit contient une pantomime que cet habile navigateur ne comprit pas, sans doute, faute de connaitre le climat du Canada.

" Le 18 Septembre pour nous cuider toujours empêcher " d'aller à Hochelaga, songèrent une grande finesse qui " fut telle: ils firent habiller trois hommes en la façon de

" trois diables, lesquels étaient vêtus de peaux de chiens
" noirs et blancs, et avaient cornes aussi longues que le
" bras, et étaient peints par le visage de noir comme char-
" bon : et les firent mettre dans une de leurs barques à
" notre non sceu. Puis vindrent avec leur bende comme
" de coutume, auprès de nos navires et se tindrent dedans
" le bois sans apparoitre environ deux heures, attendans
" que l'heure et marée fut venue pour l'arrivée de la dite
" barque, à laquelle heure sortirent tous, et se présentè-
" rent devant nos dits navires, sans eux approcher ainsi
" qu'ils souloient faire. Et commença Taiguragni à saluer
" le capitaine, lequel lui demanda *s'il voulait avoir le*
" *bateau*. A quoi lui répondit le dit Taiguragni que non
" pour l'heure, mais que tantot il entrerait dedans lé dits
" navires. Et incontinent arriva la dite barque où étaient
" lédits trois hommes apparoissant être trois diables ayans
" de grandes cornes sur leurs têtes, et faisoit celui du
" milieu, en venant, un merveilleux sermon, passèrent
" le long de nos navires avec leur dite barque, sans aucu-
" nement tourner leur vuë sur nous, et allerent asséner et
" donner en terre avec leur dite barque, et tout incontinent
" le dit Donnacona et ses gens prindrent la dite barque,
" et lé dits hommes, léquelz s'étaient laissé choir au fond
" d'icelle, comme gens morts, et porterent le tout ensem-
" ble dans le bois, qui était distant dédits navires *d'un jet*
" *de pierre*, et ne demeura une seule personne que tous ne
" se retirassent dedans le dit bois. Et eux étans retirez
" commencerent une prédication et prêchement *que nous*
" *oyons de nos navires*, qui dura environs demie heure.—
" Après la quelle sortirent lédits Taiguragni et Domagaya
" du dit bois, marchans vers nous ayans les mains jointes
" leurs chappeaux sous leurs coudes, faisans une grande

" admiration. Et commença le dit Taiguragni à dire et " proférer par trois fois, Jésus, Jésus, Jésus, levant les " yeux vers le ciel. Puis Domagaya commença à dire, " Jésus Maria, Jacques Quartier regardant le ciel comme " l'autre. Et le capitaine voyant leurs mines et cérémo- " nies leur commença à demander qu'il y avait, et que " c'était qui était survenu de nouveau ; léquels répondi- " rent qu'il y avait de piteuses nouvelles, en disant, *Nenni* " *est il bon*, c'est-à-dire, qu'elles ne sont pas bonnes.)— " Et le capitaine leur demanda derechef que c'etait. Et ils " lui dirent que leur Dieu, nommé Cudouagni avait parlé " à Hochelaga, et que les trois hommes devant dits étaient " venus de par lui leur annoncer les nouvelles, et qu'il y " avait tant de glaces, et de neges, qu'ilz mourraient tous. " Desquelles paroles nous primmes tous à rire, et leur dire " que Cudouagni n'était qu'un sot, et qu'il ne savait ce " qu'il disait, et qu'ils le dissent à ses messagers, et que " Jésus les garderait bien de froid s'ils lui voulaient croire. " Et lors ledit Taiguragni et son compagnon demandèrent " au dit capitaine s'il avait parlé à Jésus. Et il repondit " que ses Prêtres y avaient parlé, et qu'il ferait beau temps. " Dequoi remercierent fort le dit capitaine, et s'en retour- " nerent dedans le bois dire les nouvelles aux autres, les " quels à l'instant sortirent dudit bois feignans étre joyeux " desdites paroles. Et pour montrer qu'ils en étaient joy- " eux, tout incontinent qu'ilz furent devant les navires, " commencèrent d'nne commune voix à faire trois cris et " hurlemens, qui est leur signe de joye, et se prindrent à " danser et chanter comme avaient de coutume. Mais par " résolution lédits Taiguragni et Domagaya dirent au dit " capitaine, que le dit Donnacona ne voulait point que nul " d'eux allât à Hochelaga avec lui s'il ne bailloit plege qui

" demeurât a terre avec le dit Donnacona. A quoi leur " répondit le capitaine que s'ils n'etaient déliberez y aller " de bon courage, qu'ilz demeurassent, et que pour euz ne " lairroient mettre peine à y aller."

Ces sauvages disant que la rivière au-dessus de Québec était dangereuse, ont dit vrai. La prédiction faite à Cartier que la quantité de glaces et de neige les ferait tous périr, eut bien été accomplie si Domagaya n'eut indiqné à Cartier l'arbre qui devait rendre la santé à son équipage. S'ils n'ont pas parlé de maladie, c'est sans doute qu'ils n'avait point d'expression pour cela, mais Domagaya en connaissait le remède. Comment ces sauvages étaient-ils si bien instruits sur les dangers que couraient les Français en hivernant en Canada plus haut que Québec ? Je présume que c'était par l'expérience, je conjecture qu'ils l'avaient acquise par la connaissance du sort de Verazani. Les sauvages par leurs mains jointes, par ces mots *que la rivière ne valait rien* et par ce *nenni est il bon,* démontraient à Cartier qu'ils le suppliaient de ne pas partir, et leur répugnance à remonter le fleuve avec lui, quoiqu'ils eussent déjà affronté la mer sur ses vaisseaux, prouvent la parfaite connaissance qu'ils avaient du danger. L'invitation qu'ils faisaient à Cartier de rester chez eux ne peut être attribuée à la crainte qu'ils ne se joignit à leurs ennemis, puisqu'il laissait ses deux plus grands vaisseaux à Ste. Croix, et qu'il ne parait pas qu'ils fussent en guerre avec Hochelaga. En outre Stadaconé était un lieu cultivé et aux environs duquel on faisait la pêche et la chasse, qui offraient aux Français des ressources qu'ils ne pouvaient peut-être pas trouver plus haut. Je crois que leur conseil était amical, comme leur conduite subséquente le démontra, en indiquant le remède contre le scorbut, et en fournissantaux Français des vivres,

comme le récit de Cartier le mentionne.

Voyons la pantomime. Cette berge ou canot qui frappe sur le rivage représente un naufrage. Ces trois hommes si étrangement vêtus signifient des étrangers. La couleur noire indique la nuit ou la mort. Ils passent devant les vaisseaux sans les regarder, ceci indique qu'ils ne connaissaient, ou ne voyaient rien. Celui du milieu qui parle indique le chef du vaisseau. Ces trois hommes tombent comme morts dans le canot, ceci semble indiquer que ces étrangers moururent. L'enlèvement de ces prétendus morts dans le canot, indique que les sauvages avaient recueilli ces étrangers après leur mort et s'étaient emparé du vaisseau, dont nul vestige ne resta. Ces sauvages étaient convaincus que les Français mourraient tous, s'ils hivernaient plus haut que Québec, et faute de pouvoir s'exprimer assez bien par la parole, ils eurent recours à ce langage d'action.

Où le vaisseau de Verazani fit-il naufrage? D'aprés tout ce que nous avons dit ci-dessus, et d'après cette tradition qui rapporte un naufrage sur la roche de Jacques Cartier, je conjecture que ce fut là où Verazani fit naufrage Mais y perit-il? On peut croire qu'un aussi habile marin put y réparer son vaisseau, et qu'ensuite il aura pu remonter plus haut jusqu'à Champlain où il aura subi le même sort qui menaçait Cartier.

Revenons à notre canon. D'après toutes les informations que j'ai pu recueillir, il parait que ce n'est que dans l'Amérique Espagnole que l'on rencontre des canons de bronze de cette espèce. Un officier Anglais a dit à Mr. Chasseur en avoir vu de semblables à Buenos Ayres qui étaient hors d'usage depuis très longtemps, et dont les insurgés de cette ville se servaient faute d'autres pièces.—

Un capitaine de vaisseau a dit à Mr. Chasseur en avoir vu aussi dans l'Ile de Cuba. Verazani était alors au service de François I : Et ce fut le 24 Février 1525 que ce Roi fut fait prisonnier à Pavie par les armées de l'empereur Charles Quint, avec qui il était en guerre. Ceci explique pourquoi le Gouvernement Français oublia l'infortuné Verazani qui périt cette année, ou dans le cours de l'hiver suivant.

Ce fut probablement dans une de ses courses contre les Espagnols de l'Amérique, que Verazani s'empara de cette pièce sur un des vaisseaux de Charles Quint.

L'histoire de notre pays ne mentionne aucun naufrage dans des temps si reculés, d'où je conclus que ce canon est à la fois et le témoin des victoires de Verazani sur les Espagnols de l'Amérique, et du lieu de sa fin tragique.

Cette Seconde partie de ma dissertation n'est qu'une conjecture que je donne afin d'exciter les savans à répandre leurs lumières sur un sujet qui intéresse l'histoire de ce pays.

Extracts respecting this Paper and the Canon.

Chambered pieces for throwing stones called "*Canon Perriere*" (vulgarly Pattereras,) port pieces, stock fowlers, sling pieces, portingale bases, murtheress, were about this time (1521) much used in small ports and on ship board. GROSE'S MILITARY ANTIQUITIES, vol. I. p. 384.

In the page above cited there is a plate of the "Canon Perriers," which is an exact representation of the piece of ordnance mentioned in this paper.

Remarks on the COUNTRY *lying between the Rivers* ST. MAURICE *and* SAGUENAY, *on the North Shore of the St. Lawrence, by Lieut.* INGALL, 15*th Regt.*

IT was not until a very recent period that the extensive tract of country comprised between the River St. Lawrence and the mountain ridge forming the land's height, towards the north and north-west, became at all known, either with respect to its natural history, or its capabilities for settlement; nor have the public at large, to the present day, been made acquainted with the results of the various examinations of this portion of the lower province.

Many of the surveyors who have been employed, were engaged by private individuals; and the reports of those sent out by the government, were of necessity confined to the circulation of a few copies for the information of the Legislature; and, with the exception of that excellent paper on the "Geognosy of the Saguenay Country," by Lieut. Baddeley, published in this society's first volume, I know of no other authentic account of the country in question.

I have already had the honor of laying before the society my observations on the country contained between the rivers St. Maurice and Aux Lievres, as far as the junction

of that river with the Ottawa. I shall therefore confine myself in this paper to that interesting portion contained between the St. Maurice and Saguenay.

Having in my possession several private journals of surveys, as well as the maps and reports of the few public expeditions which have traversed this section of the country, I hasten to lay before the society my gleanings from the works above alluded to, trusting the few observations I have made may be the means of eliciting still further information on a subject that must be of the deepest interest to every well wisher of Lower Canada.

The accompanying map I compiled from plans of actual surveys, as well as various Indian documents, and I trust it will be found sufficient to answer the purposes of this paper.

Tradition states that as long since as the time of the Jesuits, the country between lake St. John and Quebec contained foot-paths frequently used by the early French settlers, but if this be correct, the minds of *these* men were so intent on the fur trade, then in its prime, that they cared or knew little about the agricultural resources of the country through which they travelled. Geological science at that period was so far behind the present day, that little on that head could be hoped for from the few Europeans then thinly scattered along the shores of this noble river.

At length the attention of the Provincial Government was called to this important subject, by the circumstance of the amazing influx of intelligent, enterprising emigrants, who annually arrived at Quebec, and almost invariably bent their steps either to the United States or the upper province.

Fully aware of the superior healthiness of the Lower

province over the generality of the cultivatable lands in Upper Canada, the Legislature determined upon ascertaining whether a sufficient quantity of land fit for forming settlements, and of a quality equal to that in the upper province, did not exist in rear of the old French seigniorial grants, and extending from *their* line, to the foot of the mountains; and also, whether there was not a level tract of cultivatable land within that range of mountains.

Accordingly several sums of money were placed at the disposal of His Excellency the Governor in Chief, who nominated Commissioners for carrying the wishes of the House of Assembly on this subject, into effect.

In the years 1828 and 1829 expeditions were fitted out to explore—first in 1828, the country comprised between the rivers St. Maurice and Saguenay; and in 1829 to ascend the St. Maurice to its supposed source and examine the large tract of country lying between it and the Aux Lièvres descending that river into the Ottawa.

Besides these two expeditions others were fitted out on a smaller scale to explore the country lying between the St. Lawrence and the line marked out to be pursued by the two principal parties. Having, as above stated, laid my remarks before the society, on the Montreal district—I shall proceed with a description of the district of Quebec.

The lands situated within the seigniories lying on the shores of the St. Lawrence, from the river St. Maurice to the city of Quebec are alluvial deposits of good soil, similar to that existing on the shores of the Ottawa and in the neighborhood of Montreal:—with the exception of that great sand formation at the mouth of the St. Maurice. This silecious sand deposit extends a few leagues to the north-east and spreads a few miles into the interior, when the land is

again observed to improve until it meets the ridge of high hills running from near the Grand Pille rapids towards the river Batiscan.

A great proportion of good land has been discovered to exist in the valleys of the Batiscan and St. Anne extending as far as the river Jacques Cartier, capable of supporting a large population. This tract contains but few swamps and is well watered with numerous lakes and rivers.—These rivers, after leaving their native mountain heights, encrease in size and flow through a country well covered with hard-wood; but the land in the immediate neighborhood of the hills is encumbered with the bowlder-stones so common in most parts of Lower Canada.

In following the course of these rivers to the lakes from which they derive their source, a wild and rocky country is entered, abounding in steep precipices and ranges of high hills covered with a light sand. The hollows between these hills almost invariably contain lakes, formed by the expansion of the rivers passing through them; the timber growing around their shores, as well as on the sides of the hills, consists of birch, poplar, and balsam, with occasionally some pine, and a slight mixture of maple. The small rivers and streams, tributary to the Batiscan and Jacques Cartier, are full of heavy rapids, and these rivers, for a considerable distance into the interior, have occasionally small strips of what is termed interval land, reaching from the shores to the foot of the mountains, but decreasing in quality and growth of timber as they recede from the valley of the St. Lawrence. Around many of the lakes not far within the mountain ridge a sprinkling of hard-wood, such as young beech, black birch, elm, and black ash, are now and then discovered among the young growth of

timber; but these spots of good land are of such small extent, as to be, at the present day, of little or no value.

It may not be amiss to observe that the Jacques Cartier river derives its source from a series of small lakes in the immediate vicinity of those which pour their waters into the Saguenay and Lake St. John. These lakes are represented by the Indians (and it is only from them we can at present obtain any information on the subject) as being situated among a series of barren mountains, thinly covered with a light sand, bearing birch and poplar; but as these mountains are not far from the rich valley of St. John, we must be cautious of placing implicit confidence in what they say, particularly as their contempt of all agricultural pursuits is proverbial.

On looking at the range of mountains seen from Cape Diamond, they are observed to stretch in an irregular circle from Cape Tourmente below the Island of Orleans, sweeping round towards the River St. Lawrence, several leagues above Quebec. On the south side of the river they again make their appearance in a semicircular form, at the distance of forty or fifty miles, but gradually approaching until they terminate on the shores of the St. Lawrence nearly opposite Cape Tourmente, enclosing within their vast circumference an alluvial deposit, which may justly be classed with the richest soils in America. The land in this tract (which we may term the valley of Quebec) is observed to rise gradually from the St. Lawrence to the foot of the mountains on either side of the river, and is well watered by numerous small rivers. In this paper I must strictly confine myself to the North Shore, although the south side of the St. Lawrence would be found equally interesting to the agriculturist or geologist.

From the middle of this valley rises Cape Diamond, a rocky hill of clay slate, lying in distinct strata, the interstices filled with calcareous spar, and containing small portions of rock crystal, from whence the Cape takes its name.

It is a favourite opinion that a portion of the waters of the St. Lawrence formerly flowed through the small valley of Cap Rouge, and rejoined its parent stream through the valley of the River Charles, thus forming an island of what now constitutes a cape of the main land. It would require no very great stretch of fancy to call to mind the period when the whole of the valley of Quebec was submerged as far as the foot of the circular range of mountains, forming a vast lake, whose waters seem to have retired gradually, without leaving behind any of those tremendous marks of violence, which appear to have been the result of the rushing of the waters from the mountain heights.

We may very fairly come to the conclusion that these extensive basins retained the waters in a quiescent state for many ages subsequent to the first convulsion, gradually depositing the carbonate of lime, which was held in solution, and which enclosed in the operation, the numerous marine animals now found embedded in the limestone formation, such as are found in the lime rock of Montmorenci;—this must have been previous to the last great catastrophe, as we find bowlder-stones of an enormous size lying on the surface of the secondery formation. It is worth mentioning that many of the lakes in the interior are gradually decreasing, but in no instance has any depost, but of sand, been the result.

The rocks, in situ, found in the section now under notice, are grey-wacke, clay-slate, and limestone; but this

part of the subject has been so ably handled by Mr. Baddeley, that nothing more need or can be said on that interesting branch of science. I will merely, in quitting this digression, state that bowlders of considerable size are found scattered over the summit of the cape; these stones are of sienite, sienitic gniess, and a beautiful black sienite, (hornblende in excess) containing minute crystals of manganesian garnet. Not any of these rocks are found, in situ, nearer than the range of mountains situated to the north of Quebec.

The soil in the immediate neighborhood of the cape, forms a thin layer over the surface of the rock; in the valleys is marshey and cold, improving as the land rises towards the foot of the mountains, and again falling off, until it becomes more or less sandy and encumbered with rocks.

The mountains which recede far back in the rear of Lorette, an Indian village to the north-west of Quebec, contain a continuation of good land as far as the forks of the river Jacques Cartier, in the township of Stoneham, and extending into part of Tewksbury. This rich country is generally known by the name of "Val Cartier."

As the township of Stoneham is ascended towards the river St. Asmes, in a W. N. W. direction, it becomes more hilly, and the soil consists of light sand much covered with stones. In this direction spots of land are occasionally seen on the shores of the small lakes and streams, which might be cultivated; but they occur detached and of small extent.

A singular rock existing in this part of the country was described to me by my friend Mr. Adams, an accurate observer of the beauties of nature. He described it as exhibiting

a front of clear rock, about sixty or seventy feet in width, glittering in the sun with a brilliant whiteness which rivalled the purity of crystalline marble, and conspicuous, towering above the adjacent hills for a considerable distance. On approaching its base, Mr. Adams discovered it to consist of pure white quartz and felspar, the latter somewhat in a state of decomposition; it had all the appearance of having formerly been the bed of a cascade, in which case the waters must have fallen from a height of at least five hundred feet into the valley below, where are now situated three lakes, St. Thomas, St. Vincent, and William. Indeed the shores of many of the numerous lakes and rivers in this part of the country, are composed of rocky precipices or bluff head-lands, giving to the scenery a degree of wildness peculiarly characteristic of the mountain regions of Canada. Nor are these stupendous precipices confined to the shores of lakes and rivers; they are found existing in various situations where water does not occur in the dreary tract extending to the height of land.

Near the last great fork of the Jacques Cartier river, the country consists of a chain of almost inaccessable mountains extending to the north-west and sweeping round until they join that broken chain of conical shaped hills lying to the northward of Quebec; and through whose passes, tradition says, a road to lake St. John formerly existed.

It is generally observed that the south-east sides of the lakes and rivers situated in the higher parts of Stoneham, are of superior quality of soil and less elevated character than on the north-west. The country comprised between lake St. Thomas and the last branch of the St. Annes river is generally mountainous, and the soil sandy, but on the

sides of the hills, hard-wood is occasionally discovered, interspersed among other timber. To the westward of this tract the hills become more rocky and barren. This chain of hills are not less than eighteen hundred or two thousand feet above the level of the St. Lawrence, at Quebec, and not distant more than forty or fifty miles from that city. To the south-east of this range of mountains near the small river Ki,a,los,ko,to,so, an extensive valley occurs, but the soil is poor and the timber small. The sides of the hills bounding this valley are full of dangerous chasms rendering their ascent difficult, even to the Indian hunters.

Between lakes William and the township of Tewksbury, if we except about a mile of swamp, the land is tolerably good and level, but much covered with bowlders: this tract may be considered as a continuation of the upper parts of "Val Cartier."

The north-east branch of the Jacques Cartier is the boundary of the moderately good land towards the north-east. Several mountains of a conical shape having the appearance of extinct volcanoes are seen in this part of the country, but I am not aware of lava or any vitrified rock having been noticed—when the country becomes more traversed, doubtless important geological discoveries on this subject will be made.

The character of the land in the township of Stoneham, may generally be applied to Tewksbury, as far as the point where that township is clipped in by the range of hills which form a part of the great mountain chain.

I shall now proceed to a description of the small portion of the country that has hitherto been explored lying between Cape Tourmente and the river Saguenay as far back as lake St. John. Our knowledge of this section is

very circumscribed—but it is to be hoped the necessity will be seen, of acquiring an accurate knowledge of every league of this extraordinary part of the district.

The coast from Cape Tourmente to St. Paul's Bay, exhibits a series of high capes and head-lands, gradually diminishing towards St. Paul's Bay, which is encompassed by gentle hills. The land is considered, for some distance back, as tolerably good, and in rear of the Petite Rivière, a quantity of good land is found extending round the valley of St. Urbain. In the interior, to the rear of St. Antoine, after gradually ascending for a few leagues from the seigniorial line, and thence descending from the summit of the range of hills for a league, a level tract of land is fallen in with, extending for about six miles in every direction; beyond this valley, towards the south-west, the country is known only to the Indians, who represent it as mountainous and covered with a light sand, bearing spruce and birch, and much encumbered with rocks. Towards the west, mountain is seen to succeed mountain, as far as the eye can distinguish from the most elevated spot. Great fires appear to have occurred at a recent period in this part of the country.

The range of hills between the Eboulements and Malbay are extremely steep, but more in the interior extensive level tracts are found, consisting of a black vegetable mould overlying sand. The country dividing the St. Anne's from the Cui,gat,chou,an river, is described as being a series of barren rocky hills and swampy valleys full of lakes.

In the immediate vicinity of the upper part of Malbay river, a range of steep and rugged hills occur, totally unfit for cultivation, extending far to the west and north-west, but in the neighborhood of the Malbay lakes some extensive

tracts of level land are found. In a north direction towards the little Saguenay river, and about ten miles in rear of the seigniorial line, an extensive piece of burnt land is met with bearing a young growth of birch, balsam and spruce; but around Lac Noir some high rocky land occurs, and the country in a south-east direction towards the St. Lawrence becomes mountainous. The rocks in this part of the country are sienites.

Although an opinion very generally prevails, borne out by tradition, that an active volcano is somewhere in existence among these mountains, still it wants the confirmation of occular proof—for not one of the Indians who traverse these dreary regions in pursuit of game, have ever seen the slightest appearance of fire issuing from the earth; nor have I ever heard of any scorex or other vitrified rock having been discovered in the country now under observation. Without doubt the coast between Cape Tourmente and Malbay is frequently troubled with shocks of earthquake, but whether these shocks are occasioned by the workings of some neighboring volcano is a matter of mere speculation. Nor does the appearance of the land bear evidence of there having ever existed a volcano to the south of the river Saguenay, or from the well known fertility of decomposed lava, we should find a very different kind of soil from that hitherto discovered. If a volcano is at the present period in a state of active operation, I should be much more inclined to suppose it seated among the unexplored mountains of the Labrador, to the north-east of the Saguenay, or the gulph of St. Lawrence.

To the north of the river Noir as far as the river Saguenay the country is hilly, terminating in the stupendous precipices which form the coasts of the latter river. The

vallies between these hills are of the poorest description of soil, and encumbered with the debris of the adjacent hills. The land around Bai des Roches is likewise hilly, but decreases in height in the neighborhood of the river aux Canard, where some good soil is found; a flat tract also exists behind L'Anse St. Etienne, surrounded by high hills, the soil a mixture of clay and sand, consequently of agricultural value. Another level is found extending in a zigzag form between the mountains, from near the mouth of the river aux Foin towards the little Saguenay, the soil good but much encumbered with stones. Several other level spots are found between the river St. John and the little Saguenay, but near the junction of these rivers with the Saguenay a steep ridge of mountain land occurs. The timber in all this portion of the country is generally of a bad description.

The country from Ha-ha Bay into the interior towards the west and south-west consists of moderately sized hills which encrease in height and abruptness towards the south-west. The soil in the valleys for a short distance consists of a greyish colored stiff clay ultimately giving place to sandy land; but from Ha-ha Bay to Chicoutimi is good cultivatable land, which has been traced some miles towards the south-west, though its actual extent is at present unknown. The soil is a good mixture of clay and sand blended with carbonate of lime; and limestone is found in the neighborhood. For several leagues from lake St. John, to the west and south-west, the soil is capable of cultivation and fit for immediate settlement. At the old Jesuit establishment on this lake about three hundred acres appears to have been, formerly, in cultivation, but at present it is running wild. The soil between the rivers

Metabetshuan and Onigatshouan is described as particularly good. After ascending the Assuopmoussoin for about thirty miles, the land again becomes barren and mountainous, and between that river and the Mistissini a considerable tract of poor sandy land is met with. Following the course of the Mistissini, good land is discovered for about forty miles; when a range of high and barren mountains again occur, abounding in lakes and rivers. On the immediate shores of the lake between the Mistissini and river Coucouatin, the land is low and swampy. The land around lake Onigatshouan is hilly and covered with a light sand; the timber a dwarf growth of spruce, poplar, and birch; and this character of country continues without intermission as far as the shores of the St. Maurice, and should a level spot of interval land be discovered on the shores of the numerous lakes and rivers which water this part of the district, it will invariably be found to consist of a light sand covered with bowlder rocks.

In reviewing the foregoing statement it appears that there does exist a large portion of very valuable cultivatable land fit for immediate settlement, amounting to several million acres, particularly around lake St. John. This tract possesses the advantage of a remarkably healthy climate; resembling, by all accounts, that enjoyed by the inhabitants of Montreal.

That mineralogical treasures will at some future period be discovered in Lower Canada can scarcely be doubted, from the many indications of metallic veins (particularly common iron ore and carburet of iron, commonly called black lead,) which have been found in the neighborhood of St. Paul's Bay, and also in the back townships to the north-east of the Ottawa, in the Montreal district.

As government have paid great attention to the accounts of the Saguenay country lately laid before them, it is to be hoped that ere long we shall have the satisfaction of finding the country around lake St. John yielding subsistence to a hardy and industrious race of peasantry. But previous to the formation of settlements in these remote parts, it appears absolutely necessary that the large tract of country lying between Quebec and the already explored shores of lake St. John, should be scientifically examined, not only that its actual resources should be known, but also for the purpose of ascertaining the practicability of opening a road across the country, so that in the event of townships being laid out on the upper parts of the Saguenay, and western shore of lake St. John, the settlers may have access to a market without encountering the long and dangerous navigation of the rivers Saguenay and St. Lawrence. The actual distance, drawing a line nearly north from Quebec to lake St. John is not more than one hundred and twenty miles; whereas the route by water would be nearly two hundred and fifty miles, and this latter course, from the nature of these rivers, would be closed during the winter months, the precise season when the settler could best spare time from his farm, and when he could convey his produce to market by means of sleighs with the greatest possible facility.

Doubtless many interval spots of tolerably fair land would be found on the shores of the lakes and rivers bordering such a road, which would be speedily settled from the circumstance of their being situated on a great thoroughfare.

It must also be borne in mind that the full extent of good land on the Chicoutimi has not been fully ascertained,

and it may, upon a closer examination, be found to extend between the ridges of mountains in a southerly direction much nearer to Quebec than is at present imagined.

At all events it would be attended with highly beneficial results, were a party sent overland from Quebec, to explore more closely the intervening country. Certainly great difficulties would be found in providing a sufficient supply of provisions, but by sending two parties of trusty Indians, the one from Chicoutimi and the other from Lorette, depôts might be formed on the shores of some well known lakes, sufficient to supply the wants of an exploring party. Were no other object attained by sending out such a party, the additional geographical knowledge which would be the result, would amply compensate for all the labor and expense employed on the occasion.

A few Notes upon the DARK DAYS OF CANADA, *by the Honorable Chief Justice* SEWELL, *President of the Society.*

AMONG the atmospherical phenomena of Canada, the dark days of October, 1785, and of July, 1814, appear worthy of notice. They were remarkable for their peculiarity of character, and for the circumstances by which they were accompanied; and as an attempt to explain the cause of the remarkable obscurity by which they were

more particularly distinguished has never, to my knowledge, been made, I propose in the present paper to offer to the society such accounts of these phenomena as I have been able to collect, with a few observations, which I hope will not be thought unworthy of their attention.

The first dark day of which we have any detailed account, was Sunday, the 16th of October, 1785. On the ninth of that month, a short period of obscurity occurred at Quebec, about four in the afternoon, and during its continuance the sky in the north-east quarter below the city, exhibited a luminous appearance upon the line of the horizon, of a yellow tinge. On the fifteenth, about three o'clock in the afternoon, there was a repetition of the same luminous appearance in the horizon, in the same quarter, the north-east, accompanied by a second period of obscurity, somewhat longer in duration than the first. Both of these periods were accompanied by violent gusts of wind, by thunder, lightning, and rain.*

The Morning of Sunday, the 16th of October, 1785, was perfectly calm, and there was a thick fog, but the fog was nothing more than what is often seen at that season of the year; towards nine o'clock, a light air from the north-east sprung up, which increased rapidly. The fog, by ten o'clock, was entirely dissipated; black clouds were then seen rapidly advancing from the north-east, and by half after ten, it was so dark, that printing of the most usual type could not be read; this lasted for upwards of ten minutes, and was succeeded by a violent gust of wind, with rain, thunder, and lightning, after which the weather became brighter, until twelve o'clock, when a second

* Quebec Gazette, 20th October, 1785.

period of so much obscurity took place, that lights became necessary, and were used in all the churches. This period was rather longer in its duration, than the first; a third period of obscurity came on at two o'clock, a fourth about three, and a fifth at half past four o'clock, during which the intensity of the darkness was very great, and is described by those who witnessed it, to have been that of perfect midnight. During the whole of these periods, and of the interval between them, vast masses of clouds, of a yellow appearance, which was very remarkable, were driven with great rapidity from the north-east toward the south-west by the wind; there was much lightning, thunder, and rain. The periods of total darkness were about ten minutes each, and although the intervals were not so dark, they afforded but little light.

The Barometer was stationary the whole time at 29 5, and the Thermometer, which stood in the morning at 52° fell two or three degrees in the course of the day.*

The water which fell from the clouds was extremely black; and the next day, upon the surface of what was found in different vessels, a yellow powder was floating, which, upon examination, proved to be sulphur; a deposit of a black substance in powder, was also found in the bottom of all these vessels, but I am not aware that it was submitted to any test whatever.†

Phenomena similar to those which have been described, took place at Montreal, on the same sixteenth day of October, but the darkness did not there commence until about two in the afternoon; the clouds were of the same remarkable

* Meteorological Journal of the late Rev. Dr. Sparke.

† Quebec Gazette, 20th October, 1785,—and Dr. Sparke's Journal.

yellow tinge, and were accompanied by gusts of wind, thunder, lightning, and rain; there was a period of obscurity at half past two o'clock, a second at a quarter past three, and a third at five, and during all of them the darkness was so intense, that to use the expression of one who was an eye witness, "*jamais nuit ne fut plus obscur.*" A medical gentleman of Montreal perceiving the black colour of the rain, collected, upon a strained piece of muslin, a certain quantity of the black pulverised matter with which it was charged, and by rubbing it between the fingers, and by ignition, this was found to be strongly impregnated with sulphur. It does not, however appear that any other experiment was made with it, so that we have no further data to determine its qualities,—a circumstance much to be regretted.*

I shall now lay before the society some accounts of the more recent appearances of the 3d of July, 1814, which will be found to be very similar to those which were observed on the 16th of October, 1785.

These accounts consist principally in four narratives, which I shall give at large. One from the pen of an Officer of the Royal Engineers, who is supposed to be Capt. Payne, describes the appearances at the Bay of Seven Islands, above Anticosti, on the second and third of July. The next describes the appearances during the second, at Cape Chat, from observations made by some Officers, who were on board the *Sir William Heathcott*, Transport, which lay the whole of that day at anchor in the River St. Lawrence, at that point. The third contains some additional observations respecting the appearances on the second of

* Quebec Gazette, 27th October, 1785.

July, made on that day, in another ship which also lay off Cape Chat; and the last narrative describes the appearances of the third day of July, upon the Banks of Newfoundland, of which I was an eye witness. It is taken from a journal of a voyage to England, which I made at that period in the *Phœnix*, from Quebec to England.

Before I enter upon these narratives, I beg leave to premise that the darkness of the 2d of July, 1814, does not appear to have extended much beyond Cape Chat. A mixture of ashes, and a black substance in powder, fell in partial showers at Kamouraska; and the day was there observed to be dull and gloomy,* but it was not considered to be peculiarly dark, and on this side of Kamouraska it does not appear to have attracted any particular notice; at Quebec also it exhibited nothing extraordinary except that yellow tinge upon the clouds, bordering the line of the horizon in the north-east quarter of the heavens, which has already been mentioned, and is not unfrequently seen from the walls of the garrison.*

The narrative of Captain Payne is taken from Tilloch's Philosophical Magazine, and Mr. Tilloch's correspondent makes the following introductory remark upon it:—"Your "philosophical readers will not fail to notice the coin-"cidence between the phenomena described below, and "those which were observed at St. Vincent, and other "Islands in the West Indies, upwards of a year ago."

This narrative is entitled:—

"Remarks on board ship in the River St. Lawrence, "distant about twenty miles from the Bay of Seven "Islands above the Island of Anticosti, 3d July, 1814."

* Information from several persons.

"Yesterday morning at six A. M. the weather dark and "cloudy, with a few drops of rain falling; winds high and "variable, chiefly from the eastward, and through the "day carrying all sail, the sails however of very little use, "from a very heavy swell of the sea from the westward, "which rendered the pitching of the ship very great, and "nearly endangered the carrying away of the masts and "yards; towards evening the swell abated; during the "day the clouds appeared to be coming with great rapidity "*from the northward;* horizon and atmosphere thick and "hazy; at night the darknes excessive, the masts and "rigging scarcely visible from deck; about nine P. M. a "*sort of dust* or ashes commenced falling and continued "during the night; towards the morning the whole "atmosphere appeared red and fiery to a wonderful degree, "and the moon then at the full not visible, and the "appearance through the cabin windows and crystal "lights on the deck singular in the extreme, as if sur-"rounded by a mass of fire, the sea sparkling much and "in a manner not usual in these latitudes.

"At half-past seven in the morning, candles lighted in "the cabin, and the hour by a watch at nine scarcely "visible, the flame of the candle burning of a bright "bluish white colour, and the fire in the cook-house the "same, *the wind dying away to a dead calm.* Towards "noon to-day, the atmosphere resumed something of its "natural appearance, and the sun visible, but red and "fiery, as in the winter season, as if seen through the "darkened glass of a quadrant, and by degrees becoming "more of a yellow colour. Weather hazy and sultry, a "dead calm, and the sea scarcely agitated. The sea "covered with ashes, and a bucket of water taken up

" appeared nearly as black as writing ink, from the " quantity of ashes which had fallen ; they appeared as if " those of burnt wood, and not of a heavy sandy nature, " a strong smell perceptible in the air, and a violent head " ache complained of by many on board.

" Not having a thermometor on board, the temperature " could not be observed ; it did not, although close and " sultry at times, appear to be remarkable for the season " of the year. Numbers of small birds flying about, " seemingly much disturbed. The darkness at 8 A. M. " to-day, as great as is usual in London in the month of " December at the same hour. From the darkness during " the night, the seamen were obliged to use lanterns with " candles on deck to conduct the navigation of the ship.

" Longitude 65 48 west, and latitude 49 49 north,— " 4th July; this day the ashes falling in a small " quantity, and the darkness last night excessive again, " so much so that the hand could not be observed while " touching the face ; at half past three P. M. scarcely able " to see the hour by a watch. The ashes collected on " deck appeared to be those of burnt wood, but darker " and more heavy than the ashes from a tobacco pipe.— " That collected from the surface of the sea, when dried, " resembled a cake of shoe blacking ; several ships in " different quarters of the gulf and river St. Lawrence " observed the same appearance of darkness, which appears " to have been pretty general, although not to the same " degree. No reason can as yet be assigned for this " extraordinary phenomenon,—it is conjectured by many " to be the consequence of a volcano, but the ashes by no " means resembled those thrown up by the volcano on St. " Vincent, in the West Indies, some time since."

The narrative of the Officers who were on board the *Sir Wm. Heathcott,* Transport, states that on the 2d July, 1814, there was a heavy fall of *ashes and sand,* which was succeeded by a dense haze, which gradually increased until eleven o'clock in the day, when it cleared up, and the sun was of a blood red colour. At one o'clock it again became so dark that the soldiers on board could not see to divide out their dinners without lighted candles. This darkness continued until night; and during the whole time ashes fell in abundance and completely covered the deck. The transport was the whole day off Cape Chat, the wind blew gently *from the north shore of the St. Lawrence.* The people residing down the river declared there had not been any appearance of fire in the woods.*

The third narrative is as follows :—

" On the second instant (July 1814), being off Cape Chat, " the sun assumed a very bright blood colour, and at half- " past two a total darkness ensued, this continued till " about sun set, when the horizon somewhat cleared, but " at nine o'clock it became so dark that it was impossible " to observe any object, however near, without the help of " lanterns. The ship laid too till two A. M. when the " obscurity disappeared. It is difficult to account for this " phenomenon, as it was not observed beyond fifteen " leagues on either side of the spot where the ship lay.— " For three day previous some ashes and smoke had been " observed; but on the second no symptoms of burnt wood " were felt. It may be presumed that some volcanic

* The above was received from the Officers who were on board the *Sir William Heathcott,* by Lieut. Ingall, of the 15th regiment, who favoured me with a copy.

" eruption has taken place in a north-easterly direction, " which caused total darkness in a breadth of about fifteen " leagues from each side of Cape Chat."*

The fourth narrative is in these words.—

July 3d, 1814—Sunday.—A most extraordinary day. In the morning dark thick weather, and fog of a deep yellow colour, which increased in density and colour until four o'clock P. M. at which hour the cabin was entirely dark, and we dined by candle light; the binnacle also was lighted shortly after. In the evening, at twenty minutes after sun set, there was total darkness, so much so that on the deck a man could not see another at three feet distance, this continued until the moon arose, when there was some little appearance of light, but very little; it gradually went off until it disappeared in the course of the fourth of July.— The wind during this extraordinary obscurity was *westerly, with some northing*, and the *Phœnix* was in latitude 45′, 50″, north, and longitude 53′, 12″, west.

The relative positions of the ship in which Captain Payne was embarked, the *Sir William Heathcott*, with her associate transport, and of the *Phœnix*, may be readily seen upon reference to a map of the gulf of St. Lawrence, and from inspection it will be perceived that the northerly wind which blew on the second of July carried the clouds of ashes, dust, sand, smoke, and vapour across the River St. Lawrence, in a line from the Bay of Seven Islands to Cape Chat, and that by the westerly wind which set in, in the night of the second of July, they were carried, probably with more of the same description, across the gulf of St. Lawrence and the Island of Newfoundland, to the place

* Quebec Gazette, July 28th, 1814.

in which the *Phœnix* then was, and on the *third* of July enveloped her in the same obscurity with which Captain Payne's ship, the *Sir William Heathcott*, and the other transport were enveloped on the preceding day.

For the phenomena of the dark days of Canada which have been thus detailed there appear to be but two causes to which they can be attributed—the conflagration of a forest, and voloanic action.

As to the conflagration of a forest, the facts of which we are in possession, do not appear to warrant a belief that such can be the cause. It seems impossible to suppose that the conflagration of any forest could have produced a mass of smoke so dense and so extensive as to overspread (as it did in October, 1785) the surface of a territory exceeding certainly three hundred miles in length, and probably two hundred miles in breadth,* and producing at its utmost longitudinal extremity, and at mid day, the obscurity of the darkest night. And as the whole of the cause of this obscurity proceeded, apparently, from the Labrador country, where forest trees are few in number, stinted in size, and spread in small isolated patches over a general surface of rock, it is the more improbable. In point of fact, such a mass of wood-smoke could not have been collected

* In October, 1785, the obscurity extended so as to comprehend on one side, Fredericton, in the province of New Brunswick, and on the other Montreal. A ship the *Adamant*, belonging to the house of Brook, Watson & Co. in which, it is understood, the late Sir John Johnson was a passenger, on the 16th of October, 1785, was, in the morning, off the east end of the Island of Anticosti; there it was then clear weather, but towards the west they saw a heavy black cloud, and by twelve o'clock on the same day had sailed into it, and very shortly afterwards found themselves enveloped in perfect obscurity.

American continent. The north shore of the St. Lawrence appears also to exhibit proofs of volcanic action. Malbaie, the Eboulements, and perhaps the promontory of Quebec, may be cited in support of this assertion, and the frequent recurrence of slight shocks of earthquakes in the places first enumerated, may be mentioned as facts from which a continuance of this volcanic action may be inferred. There is, moreover, a good deal of coincidence in the facts stated in the preceding narratives of the dark days, and those which are stated by Charlevoix, in his description of the earthquake in 1663, which is generally supposed to have been of volcanic origin.

" A Tadoussac" (says he) " Il pleut *de la cendre* pendant six heures."—Tom. 1. p. 367.—And in page 366, he adds, " Une *poussiere* qui s'eleva fut prise pour une Fumee, et " fit craindre un embrasement universel."

I will only add, that among the Indian tribes on the north shore of the St. Lawrence a traditional belief of the existence of a volcano in the Labrador country is said to prevail; but of the truth of this assertion, common report is the only evidence I can offer; except, indeed, to those who may still be inclined to believe that basalt may ultimately be found to be a volcanic and not an aqueous production, for by such persons the recent discovery of basaltic columns on the coast of Labrador, described in the first volume of the transactions of this society,* may be considered to afford some further proof of the authenticity of this tradition.

* Page 71 to 73.

Topographical Notices of the COUNTRY *lying between the* MOUTH OF THE RIDEAU *and* PENETANGUISHINE, *on Lake Huron, by* ALEXANDER SHERRIFF, *Esquire.*

THE extent of country along the Ottawa River, above its present settlements, and stretching from thence to Lake Huron, forms perhaps the most important portion of Upper Canada, yet to be explored with a view to settlement.—Inhabitants on the Ottawa are particularly interested in ascertaining the nature of this region, as the future progress of improvement of every kind, in this part of Canada, evidently depends mainly upon it. For some years back it has been a subject of regret that the settlements in the neighborhood of this fine river, after thinly extending along the lake of the *Chats*, have nearly come to a stand. The chief cause is evidently the inaccessible nature of the country beyond that lake, from the obstructions in the navigation, and the total want of good roads in the direction of the vacant lands; and another circumstance which has silently operated in causing a remissness with regard to removing these obstacles, is a general opinion (too hastily taken up from people caring little about the extension of population) that the nature of the country on the higher parts of the Ottawa is not such as to warrant any unusual exertion to forward its settlement.

It is certainly true that there is a considerable extent of barren ground along the Ottawa. The mountain ridge which narrowly skirts that river, from the Long Sault upwards, occupies a great portion of its northern shores, and while these barren heights are almost constantly in the view of the traveller, it is also true that there is seldom any where much display of fertility immediately along the water, the good tracts being generally lined with strips of drowned or stony land. Notwithstanding these appearances, however, there continue to be, far above the present settlements, very extensive tracts of excellent soil on both sides of the river, sufficient, without looking far into the interior, to render it a subject of interest, by what means they may be laid open for settlement.

As to the main body of the country between Lake Huron and the Ottawa, its southern extremity from the Simcoe waters to the last surveys on the Ottawa, has been traversed by two exploring parties, and in this direction a barren rocky range of high lands is described to extend nearly across the whole. Respecting the lands north of this, it has hitherto been very difficult to obtain any distinct intelligence, as they have been frequented only by a few illiterate servants of the traders. But it appearing almost certain, from various corroborating reports, that immediately to the north of these explored tracts, the country became less elevated and more fertile, the journey, of which the following observations are the result, was undertaken in order to examine into these important circumstances.

The nature of the country as far as a journey of this kind could ascertain it, though differing materially from what report had described, has far exceeded my most sanguine expectations. From the unfavourable accounts which

travellers have commonly given of the Nipissing route to Lake Huron, we had confined our hopes to finding merely a narrow, low, and fertile tract to the south of that route. —This however, is far different from the reality. About the sources of the Madawaska, near latitude 45′ 45″, the interior of the country forms a great table land, gradually declining towards Lake Nipissing, and consisting almost uniformly, as far as I have been able to ascertain, of hard-wood lands, of more or less fertility.

Along the south-westerly route of the Nesswabic and Muskoka, this description of country extends from within thirty miles of the Ottawa to the immediate vicinity of Lake Huron, a distance by the usual route of at least one hundred and forty miles; along which, excepting a few miles at the height of land, there is almost constantly in view a vigorous growth of hard-wood. Towards Lake Nipissing, I was assured by various persons well acquainted with that neighborhood, that the country continues much of the same nature as far as the lake, round its southern and eastern extremity, and along the upper parts of the little river.

The Nipissing route is undoubtedly the lowest which will be found from the Ottawa to Lake Huron. With regard to the country in this direction, the greatest misconceptions have been prevalent, not only as to the nature of the lands, but as to distances and elevation. Contrary to every opinion which I had previously formed, I have now hardly a doubt, that on a proper examination, this route will be found to combine the greatest facilities for effecting a navigation between these waters. But I shall now proceed to state in detail the information obtained on my journey.

The interruption in the navigation of the Ottawa, immediately above the entrance of the Rideau Canal, extends about five miles, in which, besides the Chaudière falls, there are three short rapids—the Petite Chaudière, the Remmok, and the Des Chenes, all running over a bed of dark blue limestone, and making together, a descent of from sixty to seventy feet. Between these rapids are short spaces of navigable water, which it seems practicable to connect without meeting with any unusual obstacle.

It has, however, been suggested that the best plan to improve this part of the river, would be by connecting the Chaudière lake (which commences above the rapids) with the Rideau Canal, thereby attaining the necessary elevation by means of the first eight locks on that work. In the view of affording a communication between the Rideau line of navigation and the upper parts of the Ottawa, it is evidently the preferable method to form the junction before descending to the foot of the Chaudière rapids; and there is also every reason to believe that this would be much the cheapest mode of improvement. I have attentively examined the ground between the head of the rapids and the reservoir at Dow's swamp, about two miles up the canal, from which the cut would naturally be led off. Throughout the whole distance, of about six miles, the ground declines gradually, or in small sudden descents towards the Ottawa, without any hollows or cross ridges whatever; so that a branch might be formed from the swamp to the Chaudière lake, requiring little more excavation than the necessary depth, and without much winding. The Rideau Canal, at the swamp, is about fifteen feet above the lake, which would allow of the cut being kept entirely apart from the rock near the rapids; and this level may be continued along

a ridge of deep soil to the bank of the lake, where of course a lock would be required. This lock, and an excavation of the above description, can hardly be conceived to require half the expense of a separate cut near the rocky shores of the rapids, with the necessary lockage of sixty or seventy feet. Keeping in view therefore, the locks at the entrance of the Rideau Canal, the improvement of this formidable interruption may be considered as half completed.

The Chaudière lake extends about thirty miles in rather a circuitous course, winding southward towards the upper end, and is from one to two miles in breadth. On the north shore, the land is remarkably fine for the first ten miles; they have been surveyed and partially settled for many years, and the remaining lots are fast filling up.—Beyond this, the north coast is low, and I believe generally poor, excepting some small tracts at the foot of the hills, which here approach within four or five miles of the river. On the south shore the soil is better, though there is a space of an indifferent quality about the centre of the lake, stretching some miles into the country. The whole body of land extending southward from this lake to the Perth and Richmond townships, has been surveyed, and in course of settlement for some years.

Towards the head of the Chaudière lake, the lands are fertile on both sides, and it is abruptly and finely terminated by a precipitous range of rocks, down which the river descends in fifteen distinct falls, averaging about twenty-five feet in height, and extending a mile and a half from the Upper to the Lower Canada shore. The scenery is singular and beautiful, and will not fail to attract tourists when there is a steam boat on the lake, which some

enterprising individuals are proposing to establish next summer. Its support is chiefly looked for in the increasing lumber trade of the river, the settlements alone being insufficient to afford an inducement; but the undertaking itself will have a great tendency to increase the population.

Immediately above the falls is a continued heavy rapid, amidst numerous islands, for nearly two miles, the whole interruption going by the name of the *Chats* Rapids, and making, it is supposed, a descent of fifty or sixty feet.—Apparently these rapids form a very serious obstacle to the future improvement of the river; but I have good hopes that on examination they will be found capable of being very easily surmounted, by taking advantage of a detached channel on the south side.

The Mississipi river enters the *Chats* lake a mile or two above the rapids, and this channel, popularly called the Mississipi Snigh, (*chenal*) leads from the backwater near its mouth, to the foot of the rapids; the supply of water being entirely regulated by the level of the lake. Along the basin below the falls, the main shore consists of a steep bank of compact blue clay, about thirty-five feet high, which sweeps round (towards the Mississipi Snigh) almost on a complete level, and joins it about half a mile from the basin. On this channel the remaining ascent, probably about fifteen feet, is accomplished in a mile, or so, of little detached rapids, and it then presents a run of smooth water to the mouth of the Mississipi; the whole distance from the Chaudière to the *Chats* lake being about three and a half miles. I ascended the river by the common route, through the middle of the rapids, and returned by the Mississipi Snigh, which, when the Ottawa is at a medium height, affords the easiest and safest route in descending.—

The breadth of the channel varies from fifty to near one hundred feet.

The stone of the *Chats* rapids, and for thirty or forty miles farther up the river, is chiefly a soft, white, coarse-grained limestone. It appears to wear fast where exposed to the action of the water, and generally near the rapids lays in large disjointed angular masses. It would afford, every where, an excellent material for rough work; and no doubt, solid quarries of the species could be found, fit for any purpose whatever.

The Lake of the *Chats*, commencing from the head of rapids, is from one to two miles broad, and about sixteen miles long, nearly in a straight direction north-west by west. Besides the Mississipi, two considerable rivers flow into the *Chats* lake from the south,—the Madawaska, passing through the township of M'Nab, and the Bonnechere, through that of Horton. These townships have a fine bold coast along their whole extent on the Ottawa, on which are some good farms of considerable size; their interior, however, is yet but thinly peopled, and is commonly reported to contain a great proportion of indifferent land. Much, however, of what is now rejected, as I am credibly informed, consists of a serviceable clay soil, principally covered with the fir species, and which will be found acceptable enough when population increases about the river.

It is a common opinion that land without a growth of hard-wood is unworthy of occupation; but this idea, though it may generally hold good farther south, should be entirely lost sight of in exploring these northern parts of Canada.—The white pine frequently forms the main growth on excellent clay soils, with but a small mixture of hardwood, and

sometimes none whatever The red pine, also well known to be so abundant on the Ottawa, is by no means so infallible a sign of inferior soil as is generally asserted. It certainly grows to a considerable size on almost bare rocks, and on arid sands, it is seen in places the sole tree for miles. But it is on strong clays that the red pine is found in the greatest perfection, and here it is usually accompanied with white pine or other firs, and frequently a mixture of hard-wood.

On the north shore of the *Chats* lake, towards the upper end, the lands have a very good appearance, and they are described to continue of a fair quality to the farther side of the township of Clarendon, situated here, and which is better inhabited than the opposite ones of M'Nab and Horton. No settlement worth mentioning has been formed on the lower part of the lake, on the north side; and, in fact, the land here, and (as before stated) for some miles extending down the Chaudière lake, is too poor to admit of much population in the present state of the country.

The scenery of the *Chats* lake is very pleasant, being diversified with a number of small islands, and from its straight form, nearly the whole extent is seen at one view. At the head, the lumberers have placed a permanent boom, extending across diagonally about three quarters of a mile, and secured midway by two anchors. It is a strong complete piece of work, consisting of long pieces of the largest pine, the ends of which are placed between a double set of other pieces somewhat shorter, and the whole jointed together with huge pins, in such a manner that the boom is flexible vertically, but immoveable sideways. There is not an ounce of iron in the whole structure, and yet it has withstood wind, ice, and flood for two years; nor is there any apprehension of its giving way. The situation is

peculiarly well adapted for it, there being a small island near the north shore, to which the boom is attached, and between this and the main, there is a good channel for boats in the driest season, which is sufficiently out of the current not to admit of the timber escaping. Formerly the raftsmen were under the necessity of putting their timber together several times between this place and the Grand Calumet rapid, about fourteen miles above; but it is now allowed to drift along that space, the only trouble being to push it out from the eddies and shores. Beyond the Grand Calumet, rafts may be floated for eighty miles without breaking up, so that this simple improvement of the boom has proved a most essential benefit to the whole trade.

There are several situations where booms of a durable nature would greatly assist the labours of the raftsmen; and in other places, in the smaller rivers particularly, a few pounds might be most beneficially expended in removing projecting rocks, against which the timber is apt to lodge, and so bar the passage for all that is behind, sometimes until the season is entirely lost, as occurred last year with some hundred thousand feet. But it can hardly be expected that improvements, even of this partial kind, will be accomplished by the lumberers, without the interference and assistance of Government.

It is now only four years since the procuring of lumber from the crown lands along the Ottawa, has been rendered a legal occupation. This branch of the timber trade has increased rapidly, and now forms a principal support of the Canada shipping. The stock of red pine in the upper Ottawa countries is probably inexhaustible; it begins to be a common growth about the head of the *Chats* lake, and

the region favorable to its production, by all account, extends some hundred miles northward. The Grand river, which traverses this region, with its numerous tributaries, promises to afford the means of obtaining the pine for market, from an almost indefinite extent of country; and in which we may expect the growth of the timber to be more than sufficient to keep pace with the annual cutting.

In all likelihood, a great proportion of these northern pine lands will be found unfit for settlement; but, considering the great support and encouragement which the timber trade of the Ottawa must afford, both to the agricultural and mercantile interests of the colony, the existence of this accessible red pine region unquestionably is a most favorable feature in the country, more so, perhaps, than if its place were occupied with the most fertile hardwood lands.

The passage of the timber down the various rapids and falls does not form the chief obstacle in prosecuting this business. In such a flow of water as the Ottawa, there is always to be found some method of passing it, either in cribs or single pieces, without much damage or extraordinary delay. The grand obstacle consists in the difficulty and expense of providing the provisions, grain, &c. necessary for the winter's operations, at a distance beyond the settlements, and with the interrupted channel of the Ottawa alone as a means of conveyance. The survey and settlement of what eligible lands may be found along the river, is one evident means of assisting the trade in this important particular. Indeed the unusual value of every species of produce in the neighborhood of the lumbering establishments has induced a number of people, at every risk, to occupy and clear lands at various places above the

present surveys, which extend no higher than the *Chats* lake.

In no view are the advantages of a navigation between Lake Huron and the Ottawa more evident than with regard to the lumber trade. By such a communication the winter supplies of the timber cutters would be obtained from the fertile countries south and west of that great lake, at one-third the cost now incurred in procuring them from Montreal, and the certain result would be an ample and steady supply of timber below the lowest of the present varying prices. If, therefore, there was no other object in view, but that of insuring a regular supply of necessaries, at the cheapest rate, for working the great red pine fields of the Ottawa, it is highly interesting to ascertain what natural facilities may exist, for a communication between Lake Huron and the upper waters of that river.

Above the *Chats* lake, the Ottawa completely changes its character, being, for fourteen or fifteen miles, comparatively narrow, swift, crowded with islands, and frequently interrupted with rapids. Immediately on leaving the lake, is the swift water of the *Chenaux*, which can hardly be termed an interruption in the navigation, being merely a smooth strong current, requiring the use of the line or pole, for one or two hundred feet. At this place, and a few others of a similar nature, I think the water wheel might advantageously take the place of the hand line, as has often been before suggested, for the improvement of such obstructions. Where the rapid is moderate, short, and deep, I do not see why this simple machine should not answer every purpose. A water wheel of twenty feet diameter, having twenty superficial feet of float-board to the current, and with its lever power increased about six times, by a

proportionate wheel and pinion, would be sufficient to tow up any vessel likely to be used on the river. To prevent delays from repairs, two wheels could be made use of, which might both be placed on the same race.

Above the *Chenaux*, the navigation is good, though with considerable current, for five or six miles, to the Portage du Fort, at which is the commencement of a chain of rapids, forming the principal obstacle to be overcome in the improvement of the Ottawa. First at this portage is a heavy, though not a continued rapid, for about a mile; a league, or so, more of hard paddling, brings us to the des Sables Portage, only a few hundred feet in length, past a short rapid, easily run down by canoes. Below this, the river forms two channels, enclosing the Grand Calumet island,—the south, and by all accounts, the largest division, is called the Rocher Fendu. It is seldom followed by canoes, on account of its rapids being spread over a much greater space than on the north channel On the latter about a mile above the Sables, is the mountain fall, about ten feet high and two hundred feet in breadth, a heavy body of water descending in a smooth unbroken sheet, with a short rapid below. The portage is hardly a quarter of a mile, and notwithstanding the name, there is no eminence of any consequence near it. A mile farther, with a moderate current, is the Derangé rapid, a strong rush of water for rather more than a furlong, which, however, canoes run down. Beyond this, about three quarters of a mile, is the Grand Calumet rapid, the least and longest in the range, and in which are several falls. The portage is a full mile in length, uneven and rocky. The extent of all these rapids, by the course of the river, which is very circuitous, appears to be about eight miles. I could form

little idea, in going up the river, as to the amount of the fall on this part of it, but having returned by the route of the Musk-rat lake, in which direction the whole descent of the ridge is comprised, within the space of a mile or two—I think it may be from ninety to one hundred and twenty feet.

It is impossible to ascertain any thing of the nature of the lands hereabouts, merely from passing up the canoe route; the shores are hardly ever discovered with certainty, on account of the great number of islands, which appear nearly all of a very rocky nature, and are covered with a dense growth of pine, cedar, &c. This is also the growth of the main shores, where they can be distinguished; no hardwood being visible from the *Chenaux* upwards, excepting on one or two low islands. I was informed, however, by some people who have taken up their residence at the mountain fall, that on the north side, behind the fir-timbered shore, a good level tract of land extends from the Portage du Fort, to the neighborhood of the Grand Calumet rapid, and for many miles into the country. On the south side of these rapids, the Grand Calumet island presents a very barren appearance, nor, by all accounts, is there a great extent of good soil on any part of it; it has, however, been rich in red pine—many large rafts have been taken from thence, nor is the island yet exhausted.

The south shore of the river, from the *Chenaux* to the Portage du Fort, is composed of a pine-timbered ridge, which, in viewing from the water, I had noted down as a barren height; but having occasion to traverse it in returning, I found it to consist of a good strong clay, the growth being principally large white pine, with some hardwood. The ridge, apparently not exceeding one

hundred and fifty feet in elevation, is the continuation of the one forming the great range of rapids above described. About a mile from the *Chenaux* the ground begins to fall away to the westward; so that from this singular formation of the country, the waters which take their rise a mile or two from this part of the Ottawa, after making a circuit by the Musk-rat and des Allumettes lakes, of nearly one hundred miles, again approach within a few hundred yards of their source.

The Musk-rat lake lays about eight miles south-westerly from the Portage du Fort. A good road has been opened for several years from the portage to the lake, which, with the river of the same name, affords from the end of the road, a smooth uninterrupted navigation, nearly to the upper des Allumettes lake, the last two miles along only being rapid. This has long formed the winter way of the lumberers to the higher parts of the river. The whole distance from the Portage du Fort to the mouth of the Musk-rat river (about three miles from foot of the des Allumettes) does not exceed twenty-eight miles, which is little more than half the length of the route between the same points, by the Grand river.

The comparative ease and expedition with which the des Allumettes lake may be reached by this route, even in summer, by using small light canoes, has given rise to the idea, that it affords a very favourable opportunity for surmounting the rapids on the neighboring parts of the Ottawa, whenever their improvement shall be seriously contemplated. In returning I ascended the Musk-rat river and lake, and leaving the Portage du Fort road to the left, followed up the lake waters eight or ten miles farther, along a chain of smaller basins, from which, by

a long portage we gained the Ottawa, about four miles above the *Chenaux*. The Musk-rat route is certainly not a favorable, and, perhaps, hardly a possible one, for a canal. The Lake is probably a sufficient reservoir to supply a lockage both ways, or might easily be made so by feeders from the Bonnechere; but its surface is thirty or forty feet higher than that of the upper des Allumettes, which would of course occasion an extra lockage of twice that height above the necessary ascent on the Ottawa. Besides this, it does not appear to be practicable to lead the Musk-rat waters towards the Portage du Fort, from the elevation of the intervening ground; and as to the chain of small lakes, extending in that direction, the stream through them is evidently insufficient, and at two great a height to be increased from any source which could be depended on.

The most favourable route for improving this part of the Ottawa, will probably be found on the Lower Canada side, through the hard-wood lands, extending from the Portage du Fort, towards the Grand Calumet rapid. Through this tract also, the indefatigable lumbermen have opened a road, as far up as the Derangé rapid; and this being only four or five miles in length, the direct extent of the whole interruption, including the Grand Calumet, cannot much exceed six miles. Along this shore (as far as I could see from the canoe route), there is no appearance of a ridge of land; indeed, as before mentioned, the main shore can seldom be distinguished from the islands, so that the ground probably has a gradual slope from the river, which shape would afford every facility for leading the water along at the required elevation, whatever it may be.

The chief difficulty on this route would probably be

at the Grand Calumet rapid, which is lined on both sides by high rocky shores. To the south of the portage, however, in the island, there is a hollow extending the whole way to the still water above, along which it appears practicable to effect a lockage. The chief rock about here is still the white coarse limestone, admitting, I think, of being easily quarried; this species of stone is seen no farther up the river. With the exception of some detached masses of the granite kind, it appears to form the channel of the various rapids from the *Chats* thus far—its character, however, varies much along this extent: commonly it is large-grained and brittle; in a few places I observed it forming almost a complete flint, and in others its nature is that of a coarse marble, well adapted for any purpose of building.

In comparing this route, by the Ottawa, with that of the Musk-rat lake, in point of distance, we shall find no very essential difference in favor of the latter, if we extend our view to the head of the great island, des Allumettes, and consider the channel to the north of it, called the Quelle Butte Snigh (*chenal*), as a part of the Ottawa route. A strong reason in favor of keeping by the Grand river seems this: —Were the Musk-rat lake and river chosen as the line of improvement, the whole of the north channels of the Ottawa, from Portage du Fort to the head of Quelle Butte Snigh (*chenal*), a distance of fifty miles and upwards, along which there are many fine tracts of land, which would be left entirely in the back ground, and little benefitted, being shut up at every point by rapids, from what would then be the navigable channel. Whereas, were the thoroughfare established along the northern runs of the Ottawa, (these rapids being necessarily improved) the country along the

des Allumettes and Musk-rat lakes, would almost equally partake in the advantage, in addition to the facilities of their natural route by the latter lake.

Were it only sought to pass by the formidable obstruction of the Calumet rapids, by a railway, or good common road, certainly no other line could enter into competition with that by the Musk-rat waters. The road from the Portage du Fort to the lake, though I did not pass along it, is well known to run over a suitable and level soil, and from every account, might be continued on favorable ground to the foot of the upper des Allumettes, bringing us at once to the uninterrupted navigation extending near fifty miles along that lake and the deep river. This road would be about twenty-five miles in length, and mostly through lands fit for cultivation. As far as I could ascertain, nearly the whole of the considerable space between the Musk-rat run of water and the great bend on the Ottawa, is fit for settlement. Along the Rocher Fendu there is said to be a wide extent of hard-wood land. The large point between Coulonge lake and the lower des Allumettes, is known to be almost throughout of the same nature, and on the lower part of the des Allumettes, the soil is also generally good.

From the head of the two mile of rapids near its mouth, the Musk-rat river forms a deep still winding channel, gradually widening from one to two or three hundred feet, and at last spreading into an extensive muddy pond, covered with weeds and wild rice, about which I saw more wild ducks and geese than in all the rest of the journey. Leaving this pond, the river continues in a fine broad channel about one mile and a half farther, when the Musk-rat lake opens to view nearly from one end to the other, extending remarkably direct to the S.S.W. nine or ten

miles, and with a very uniform breadth not exceeding half a mile.

The lands all along the Musk-rat river seem to be of excellent quality, though not chiefly timbered with hard-wood. A good clay soil prevails on both sides of this stream, (amidst a variety of other trees) the finest red pine, and constituting from situation, soil, and timber, the most valuable land in this part of the country, before the lumbermen had commenced their operations upon it; but the full grown red pine is now mostly cut away from the vicinity of the water. The finest square timber which has yet descended the Ottawa, and nearly all the red pine spars (for which the choicest trees only will answer) have been cut in this neighborhood, and from actual examination I am convinced that much of the land producing this valuable commodity in such perfection, is suitable for cultivation.

About the great rice pond, and the channel leading from it to the Musk-rat lake, the lands are fertile. Several farms have been commenced in this neighborhood, one of which is not less than fifty acres in extent, and a road has been formed to a large bay on the lower des Allumettes, only two or three miles distant, on which also there is some settlement.

On the Musk-rat lake, the lower part of the eastern shore is formed of low rocky hills, with a growth principally of poor red pine, which, however, from every account, does not continue far from the water. About the head of the lake is some of the finest land I ever saw, a strong free clay, and yet with a moderate growth of timber. This tract, extending several miles along and back from the eastern shore, is in a fair way of being settled. There is already a

considerable clearance at the extremity of the Portage du Fort road, where two families reside; and one of the men informed me that he expects eight neighbors by the spring.

The western shore of the Musk-rat lake, along its whole extent, consists of a slightly rising ground, covered near the water with a stout forest of white pine. I have not been able to get much information with regard to the country between this side of the lake and the Bonnechere river, about ten miles distant; but at least a considerable portion of it is composed of hard-wood lands, lying along a stream called the Snake Creek, which winds through this tract, almost on a dead level for many miles, and enters the Musk-rat lake a little above the outlet.

Along the chain of small lakes, extending between the Musk-rat lake and that of the *Chats*, the lands are poor; on the north shores, little is seen but light sand and red pine; on the south, the soil is somewhat better, bearing good white and red pine, with a mixture of hard-wood.

The nature of these little lakes is very singular, the whole bed of their waters being composed of a substance which I take to be the finest marl. It appears to have been formed by a vast deposit of shells of various sorts. They are yet but partially decomposed in many places, the mass being half made up of larger and smaller fragments. In other places it is soft, unctuous, and remarkably white, resembling the finest lime plaster ready for use. It evidently forms the main bed of the lakes, being visible at the bottom entirely throughout the small ones, and in the larger to a depth of twenty or thirty feet. The shores, however, are not uniformly composed of the marl, being, in places, lined with a deep mud, of such a consistency, that it is very difficult to get a canoe to or from the solid

bank. In other places, a singular tough moss of a redish colour, forms a quaking precarious wharf, extending many yards into the deep water. Where the shells are least decomposed, a strong unpleasant odour is emitted from the moss; the water, however, has merely a slight earthy flavour, is remarkably clear, and abounds with several kinds of fish: the surface, when viewed either near or at a distance, has a bright green appearance, quite different from that of any other I ever saw.

These ponds commence about a mile and a half from the Musk-rat lake, and as far as I followed them, extend about seven miles south-easterly; there being in this space nine basins, one or two of them upwards of a mile in length, and frequently separated merely by reedy flats or narrow sand banks. A few days labor only is wanting to complete the canoe route along them, as we found, nearly throughout, old timber roads leading from one basin to the other. The portages are all short, excepting the first from the Musk-rat lake, and the last to the Ottawa, which is nearly three miles, both being, however, along level and firm roads.

This chain of small lakes does not end where we left them, but, taking a southerly direction, they continue into the surveyed lands of Horton,—the tract along which they extend is the highest, and probably most fertile, in this part of the country. From hence towards the higher parts of the Bonnechere, the ground declines, so that between that river and the Musk-rat lake, the lands are low and level. This is evident from what is known of the Snake creek, which forms a still winding channel, from the vicinity of the Bonnechere to the lake.

I have been particular in attempting to give an idea of

this section of the country, as it undoubtedly forms one of the most eligible positions for settlement in this part of Canada. The whole tract to which I allude, extending south-westerly from the Ottawa, across the Musk-rat waters to the Bonnechere, and north-westerly from the lake of the *Chats* to that of the upper des Allumettes, may contain from three to four hundred square miles—throughout the whole, limestone is abundant.

As long, however, as the Chaudière and the *Chats* rapids continue unimproved, we can only hope to see a slow and partial settlement of the finest townships above these points. The fine navigation of the Chaudière and *Chats* lakes, is rendered nearly unavailable by these interruptions; and as to roads, passable ones at least, are hardly known on the Ottawa, from Grenville upwards; a proof how little is to be expected from them towards the settlement of the more interior parts. Had there been no *Grand River* in the country, we should, probably by this time, have seen a good main road somewhere near the ground which it occupies; but as it is, whilst there is a possibility of scrambling up the rapids, nobody will trouble their heads about any thing of the kind.

At the Chaudière, as before explained, the work of improvement is half completed, or will be so with the first two miles of the Rideau canal. Both there and at the *Chats*, I am confident that the necessary works will be found remarkably easy of accomplishment, considering the formidable appearance and actual elevation of the rapids.—In order to obtain the full advantage of these two improvements, a plain timber rail-road would probably be found requisite, from the Portage du Fort to the upper des Allumettes lake, which, in addition to the Musk-rat country,

would lay open for settlement, a considerable extent of fertile lands, touching upon the fifty miles of smooth water immediately beyond that tract. Considering the great space of new country which would not fail to be rapidly peopled, and also the fine districts, near the proposed line of operation, already partially settled, particularly along the Mississipi, there can hardly be a doubt that the conveyance along it, would soon reimburse the outlay, without taking into account the sale of the wild lands, and the revenue from the crown timber, which would be greatly increased by these improvements. I shall, however, return to the description of the Ottawa, being convinced that correct information, with regard to the whole country, cannot fail to lead the public mind to something far beyond these partial improvements.

At the head of the Grand Calumet rapid, the Ottawa, in its northern channel, again assumes a new character.—This branch is now of a uniform breadth, generally under a quarter of a mile, free from islands, with a strong steady current, and apparently of equal depth from shore to shore. This description holds good for about fifteen miles, to the head of the Grand Calumet island. For the first four or five miles, the river is hemmed in by precipitous rocky shores, frequently, on the island, presenting a solid perpendicular face, eighty or one hundred feet in height.—Above this, the appearance of the country becomes more encouraging. A great part of the Lower Canada shore consists of level hard-wood lands, circumscribed, however, by fir-timbered hills and ridges, seldom more than two miles distant from the river. On the island, there also appears to be some great tracts of land along the shore, on which, at one place, is a considerable clearance, occupied

by two or three French families. About the middle of this run, the great northern range of hills comes once more into distant view. Near the upper end is the *Grande Marais,* an open marsh, extending several miles north-west from the river, and which, when overflowed in high spring waters, affords, with a portage of half a mile, a short passage to lake Coulonge.

Thus far, the course from the Grand Calumet is about N.N.W. and very direct; the channel, notwithstanding its narrowness, being frequently within view for miles. From the *Grande Marais,* it winds westerly, for about two miles to the head of the island. Here the water scene suddenly expands. We enter, as from a branch, the main body of the river, the channel of the Rocher Fendu extending in view to the left, three or four miles, and upwards of a mile in breadth; the main river spreading its channel a considerable distance to the right, amidst some rich looking islands. At the upper end of the Grand Calumet island, appears to be a tract of good land; and on the Upper Canada shore, the whole extent in view is fertile, judging from the nature of the timber, which is seen, from the gradual rise of the ground. On this shore, a little above the division of the waters, is the la Bosse settlement, consisting of a narrow entrance, about a mile in length, with eight or ten huts. The poor unprogressing appearance of the place, at once marks it as a nest of old trading people—French, or Bois Brulées.

Passing the islands near this settlement, we suddenly come in view of the Coulonge lake, and the northern hills immediately beyond it, which are now seen gradually to close upon, and follow up the river, presenting a bold swelling face, five or six hundred feet in height. Below

these, on the north bank of the lake, is the Company's establishment, called Fort Coulonge, a double row of neat white-washed buildings, contributing much to enliven the scecery. Lake Coulonge is about seven miles long, and in some places, nearly two broad. Along its Upper Canada shore, the lands continue to have a most favorable appearance, gradually ascending from the water, with a flourishing growth of hard-wood, and a little white pine. On this side, opposite their station, the Company have a farm of sixty or seventy acres, and a little below this are two small clearances lately commenced. I have already mentioned that the space of country between this lake and that of the lower des Allumettes, consists, nearly throughout, of hard-wood lands. This tract is now well known, and uniformly spoken of as being of the best quality. The Upper Canada coast, on this part of the river, is almost entirely hard-wood land, for nearly thirty miles. Commencing some where near the middle of the Rocher Fendu, it continues of this nature, with very little interruption, to the mouth of the Musk-rat river, on the upper lake des Allumettes.

On the Lower Canada side, the river being now closely skirted by the hills, the appearance of fertility becomes more rare. The barren aspect of these heights, towards the Ottawa, has a tendency to convey discouraging ideas of the country beyond them; but from every thing I could learn, there is no reason to infer that this sterility extends to any great distance. It is, indeed, very difficult to obtain distinct information respecting this back country; but as even the vague account I may furnish of this subject, is better than none, I will here sum up the chief particulars which I have gathered concerning it.

From the Grand river, these northern heights have every

appearance of being a distinct range of hills; excepting, however, where evidently detached, they form merely the face or ridge of an elevated tract of country, watered by the Gatineau river and its tributaries, there being generally very little abrupt descent to the north, and freqnently none whatever. These high grounds almost every where seem to incline towards the Gatineau, nearly from the extremity of the ridge. From the mouth of that river, a little below the Chaudière falls, to lake Coulonge, there is not a single stream from the northward, which can be supposed to extend beyond the foot of these heights. The small river Coulonge enters the lake of the same name, and about ten miles farther up, there is another considerable stream called the Black river. The valley which these waters occupy, must extend some distance into the highlands, and forms the only exception to their general lay towards the Gatineau.

Near the Chaudière lake, the nature of these elevated tracts is well known. On ascending them, about ten miles below the *Chats* rapids, a table land is met with, and several small lakes not far from the ridge. From these, the waters run to the Gatineau, on approaching which, the lands are good.

Every thing I have heard favors the idea that along the whole of these heights, the lands improve and become habitable, soon after beginning to decline towards the Gatineau. About one hundred miles from its mouth, this river is joined by a considerable tributary from the north-west, called les Deserts. For upwards of forty miles, I am assured, the course of this river is through open plains, from one to three miles in breadth, and of the richest soil, beyond which, forests of maple, elm, and basswood,

indicate a continuation of fertility. The Deserts runs in a direction about parallel with the Ottawa, and at no great distance from it, as the Indians pass with their canoes from the one to the other in the course of a day and a half. Their route is by the Coulonge river, which probably affords the best access for exploring these parts of Lower Canada.—The route by the Coulonge must be very difficult for some way; but when once the eminence is fairly gained, the different branches of the Gatineau present the means of penetrating the country easily in various directions.

By ascending the Deserts, canoes may pass with great celerity to the head waters of the Ottawa. On leaving that stream, a large lake with numerous islands, is traversed, called Lac des Ecorces, probably the source of the small river du Moine, flowing into the Ottawa, about sixty miles above lake Coulonge. Northward from Lac des Ecorces a day or two's journey, is the grand reservoir of the Ottawa, called, by the traders, the Grand lake, which, from all accounts, must be nearly half as large as Lake Ontario.—There has been a trading establishment for many years on the south coast of the Grand lake, which is consequently well known to many connected with the trade. It is decidedly spoken of as exceeding forty miles in breadth, the shores being entirely out of view of each other, and the length, extending chiefly east and west, is said to be at least one hundred miles. I was informed by a person who had performed the journey, that light canoes may pass between the Grand lake and the Gatineau, by the route of the Deserts, in four days. If this be the case, that great sheet of water must extend, inconceivably, nearer to the settled parts of the country, than the course of the Ottawa, as far as it is known, would lead one to conjecture.

On leaving lake Coulonge, after passing some low islands, we arrive at the foot of the great island des Allumettes, about two miles distant from the lake, by which the waters of the Ottawa are again divided for many miles.

At the point of division, the whole of the surrounding shores have a fertile appearance, though no very extensive view of them is obtained. For a little way below the Island the river is not much more than a furlong in breadth and the current very strong. Here Mr. Simpson, Governor of the Company, passed us in his return from a northern tour, impelled by the strength of the stream and ten or twelve stout paddles, almost with the velocity of the wind. Immediately after, we fell in with a very different personage, a settler, who had made his selection on the Lower Canada side, apparently but a day or two before, his family and luggage being still scattered among the bushes. The adventurer was standing on the beach very composedly, with his hands in his pockets. His intention, he said, was to clear land and lumber some; and, he might have added, to keep a rum and whiskey shop, when he could obtain a supply. Certainly, no better situation could have been pitched upon for this junction of occupations.

I had no opportunity of seeing the southern division of the waters, from this point to the upper des Allumettes lake, but the following is the general description of it:— Nearly from the foot of the island, this part of the river forms a swift current or gentle rapid, for three or four miles amidst numerous islands. Beyond this is the lower lake des Allumettes, a fine piece of water, upwards of ten miles long and two or three broad. Between it and the upper lake, is a moderate rapid, a mile in length, easily descended by canoes. Along the island, on the lower lake

des Allumettes are some hard-wood lands, but the principal timber is the red pine.

The north channel, called the Quelle Butte *Chenal,* has a pretty direct course, nearly west, about eighteen miles, being reckoned about eight miles shorter than the route by the lakes, and is always followed by the voyageurs. For the first two or three miles, the channel is uniform, seldom more than a hundred yards wide; and it then opens out, forming a succession of small lakes, which afford a variety of pleasant scenery. The hills are constantly in view, sometimes approaching to the edge of the water; their usual dark woods of tamarac and pine, varigated by the light foliage of the dwarf birch, and a few of the hills entirely covered with the latter.

On the north, the hard-wood land continues along the *Chenal* for a few miles, after which, the stony heights closing in upon the shore, there are no farther signs of fertility on that side. Along the island we see little but red pine sands for half the way, when there is a change for the better, and the lands possess a very favorable appearance, nearly to the head of the island.

About half way up the Quelle Butte *Chenal* there is a swift rush of water, for one or two hundred feet, called the Chapeau rapid, hardly sufficient, however, to arrest the course a steam-boat. In fact one of our canoes ascended it by the force of her paddles alone. There is no further obstruction, till we reach the Quelle Butte rapids, within two miles of the head of the island; so that with the above trifling exception, this channel completes an unbroken navigation, from the head of the Grand Calumet rapid, of about forty five miles.

The Quelle Butte rapids consist of two short interruptions,

about half a mile apart. The first is a moderate rapid, between one and two furlongs in length, which we ascended by dint of poling and towing. Heavy canoes must, however, discharge half their cargoes for a short way. The upper rapid is shorter, but has a small fall at the head. After poling some way, there is a sudden turn to the right, into a little still recess, and from it, the canoes are lifted a few yards over a bare solid rock, into a circular basin about a furlong in diameter, from which no outlet can at first be perceived. The water of this basin is eight or ten feet higher than that of the rapid, and on a level with the lake des Allumettes; a very trifling excavation would lead it over the rock. In every respect this is naturally the most complete mill-seat I ever saw. A deep narrow channel leads out of these curious recesses, when the upper coasts of the des Allumettes immediately open to the view. The head of the island is between one and two miles distant, and the *Chenal* gradually widens, until it unites with the the lake, here, about two miles broad, and containing numerous islands.

The upper lake des Allumettes continues nine or ten miles above the island. Near the head, it makes a complete bend northward, to the foot of that section of the Ottawa called the Deep river, when the course turns abruptly to the north-west. A little below the Quelle Butte rapids, the hills recede from the shore, leaving towards the lake, a wide level space, extending to the Deep river, chiefly hard-wood lands. The coast, however, as is usually the case, gives no indication of fertility, being along the whole of this tract poor and stony.

At the foot of the Deep river, the heights at last completely close upon the Ottawa, forming along its channel,

a continued range, from five to seven hundred feet in height, and shutting out all further appearance of fertility on the north shore, as far as I ascended, fifty miles above this point. The Upper Canada shore also, along this space, has a very discouraging aspect, being generally composed of pine-timbered ridges, fifty to a hundred feet high, evidently of a sterile nature, which, however, on the greater part of the distance, do not continue far into the country, as I shall have occasion to remark immediately.

The scenery of the Ottawa, now becomes very striking; the tourist, at least, will little regret the want of fertile coasts amidst the succession of romantic views, which every mile of the river presents along these high lands.—From a hill about five or six hundred feet in height, at the foot of the Deep river, is a prospect, which I have no where seen surpassed. The portion of the Ottawa within view is, perhaps, the most remarkable and beautiful in its whole course. To the right is the Deep river, extending upwards of twenty miles along the base of the heights, in the straightest possible course, and yet lined with the most uneven succession of rugged points. To the left, is the whole of the spacious winding of the upper lake des Allumettes, with its numerous islands, and a part also of the lower lake, is visible beyond the great island. Several smaller lakes are seen on both sides of the river, and among the rest, one singularly situated half way up the hill from which the prospect is obtained.

The view south and westward, into the country we were about to penetrate, is also very extensive, and was of course, peculiarly acceptable; though the elevation was not sufficient to enable us to trace the waters very far amidst the forest. A very good idea, however, is here obtained of

the general form of this part of the country. From the foot of the Deep river, the bed of the Ottawa lays between west and north-west, for at least fifty miles, as may be distinguished from the northern heights. About the end of this space, we can perceive that the ridge extends across the river, with an inferior height, and takes a southerly direction, gradually rising again to an elevation equal to that on the Lower Canada side. A great branch of these barren highlands extends in a gradual slope, quite to the lake des Allumettes, occupying ten or twelve miles of its southern coast, above the Musk-rat river. This extension of the heights forms, with the main ridges on both sides of the river, a great semi-circular valley, stretching about forty miles up the channel, and near twenty miles into the country, at the broadest place. Excepting a rough ridge along the Ottawa, this valley appears to be fertile as far as the nature of the timber can be distinguished from the hill. About the middle and broadest place, it presents a very gradual ascent to the heights, so that there is hardly any decided ridge for some miles; and at this point, as I afterwards ascertained, the interruption of rough country towards the interior hard-wood lands, cannot exceed six or eight miles.

A considerable bay extends into this valley from the lake des Allumettes; and it is penetrated for several miles farther, by a singular channel of still water, forming a succession of narrow straits and small lakes, which are only separated from the Ottawa, by a little fall one or two feet in height, at the head of the bay. Into this channel flow two streams, the largest proceeding from a piece of water, three or four miles long, called the Maskinongé lake, which, as near as I could learn, lays about ten miles

west from the des Allumettes, and is but a few feet above its level. The inlet which these waters afford for several miles, will, no doubt, be found of considerable importance when the settlement of this part of the country is seriously undertaken; as it is apparent that the only eligible route for a main road from the Ottawa to the great hard-wood table land, is through the Maskinongé valley.

I had entertained hopes of being able to make my way towards lake Huron, up the valley, and so obtain a more distinct knowledge of this interesting line of country; but after attempting it for five or six miles, we found it impossible, there being no canoe route whatever through it to the westward; and indeed the run of water seems quite insufficient to admit of one. From the appearance of this great hollow, one would expect it to be a main conductor from the inland lakes. The waters, however, not only from the interior, but from the vicinity of the higher parts of the Ottawa, are carried round the extremity of the valley, forming, with streams from other points, a large river, which continues its course in a singular manner, closely along the verge of the heights, and enters the des Allumettes, about five miles below the outlet of the Maskinongé.

This river, as far as I have seen, is the largest of the Upper Canada tributaries. With little exception, it traverses the whole country, inclining towards the Ottawa, from the Musk-rat to the Little river, a distance of nearly one hundred miles by the parent stream. The water which it discharges is of course very considerable, nearly equal, I think, in the autumn, to that of the Rideau, in the ordinary flood of the spring. About six miles from the mouth of this river, there is a large branch to the south-west, called the Pittoiwais, on which is a considerable lake of the same

name, situated between the sources of the Madawaska and the Bonnechere. The main river continues a westerly course, in an undivided channel, to the verge of the elevated table lands, when it branches out into a number of streams, forming an infinity of small lakes in every direction. I could hear of no distinct name for the lower main channel of these waters; but the branch extending farthest into the interior, is called by the Indians, the Nesswabic, which, therefore, may be considered as the proper designation of the whole river.

Along the Nesswabic is the only canoe route from the des Allumettes towards the Huron rivers. This route is one of the utmost difficulties for the first forty or fifty miles, the river being, as far as the level country, almost a constant succession of rapids, which cannot be ascended in less than seven days, by a light canoe in the dry season, and is hardly ever attempted at any other time. The upper parts of the Nesswabic, however, may be reached without the arduous ascent of its main channel. As before noticed, some of its branches make a near approach to the Ottawa, beyond the Deep river, and by these there is more than one route into the heart of the country. Among the rest is one leading from the neighborhood of the Deux Rivières rapid, about fifty miles above the des Allumettes, of which I was fortunate enough to procure a chart from some Indians at the lake. We could not expect to save much time or labor by following any of these routes, which require much portaging, and are of course circuitous; but they afford the advantage of a much more extensive survey of the Ottawa than I had expected to obtain, and also the preservation of our bark canoes, on which every thing depended, made it in a manner necessary to avoid the

rapids of the lower Nesswabic for the present, which I therefore resolved to do, and resumed the ascent of the Ottawa on the 27th of August.

On the upper des Allumettes are two trading houses, one belonging to the Company, called Fort William, and the other to some private traders. At these stations we had made little doubt of obtaining some distinct accounts of the country towards the Hurons, and also of procuring a guide acquainted with it, in our intended direction, at least until fairly past the division of the waters; but in both these particulars I was disappointed. The lands of the Algonquin Indians frequenting the Ottawa, do not extend quite to the height of land, at least on the Nesswabic; and the traders on the Grand river, have no communication with the Mississaguas, who hunt beyond the Algonquins. All the information obtained, therefore, amounted to this, that along the upper waters of the Nesswabic was a great extent of fertile level country, and that by following up the most westerly branch of this river, canoes could pass to the streams running in an opposite course. We had previously received information of a considerable river rising in that direction, and flowing south-westerly to lake Huron; but whether it was this or some other that might be reached by the above route, I could not ascertain.

As to a guide, after some fruitless enquiry, I was obliged to be satisfied with an Indian canoe-man, in the employ of the traders. He had travelled no part of our intended route, but was an expert tracer of hunting tracks and portages, and could act as interpreter, in obtaining information from the Indians we might fall in with.

From the lake des Allumettes, the Deep river continues to form a fine navigation, for about twenty-five miles. It

is so remarkably straight, that even from the surface of the water, at the foot of the channel, twenty miles of this distance is completely within view, though at various points the breadth does not exceed one quarter of a mile, frequently, however, spreading out to half a mile and upwards. Notwithstanding the inconsiderable width, there is hardly, on account of its depth, a perceptible current in any part of this water, and it is therefore appropriately termed the Deep River. The northern ridge continues to afford the finest views along the whole extent. For some miles on the lower part, it presents a precipitous face to the water, in places quite perpendicular to a height of two hundred feet and upwards. About midway, the heights fall back a little from the river, and form detached hills free from timber of any kind, being covered for miles with a close carpeting of blue-berry bushes. Beyond this, the range again approaches the channel, apparently higher than ever, presenting now a steep face towards it, six or seven hundred feet in elevation.

The Deep river is terminated by the rapids of the Deux Joachims. This is a heavy continued ruth of water, for upwards of a mile, forming a circular sweep to the southward. The point thus formed is penetrated by a small bay, from which a ravine continues for some way along the base of the heights towards the upper still water. The portage is commenced from this inlet, and at about half way is interrupted by a considerable pond, so that the carrying altogether does not much exceed half a mile. On the whole, the vicinity of this rapid appears very favorable for improvement.

Above this rapid, the river forms a smooth channel for ten or twelve miles, though with considerable current,

the breadth seldom equalling half a mile. The nature of both shores here is much the same as on the Deep river; the hills continuing closely along the north side, and the fir-timbered ridge on the south. The latter is interrupted a little above the Deux Joachims, by a stream from the low lands, before mentioned to extend in this direction. The appearance of the timber about the ravine of this stream, is rather more favorable, and I think it very probable, that on proceeding inland, good soil will be found on the upper part of this great valley. About the middle of this stream, the river du Moine enters with a rapid channel from the north. It appears about the size of the Rideau and descends to the Ottawa through a deep narrow valley appearing to extend some way into the country. Above the du Moine the north highlands assume the most pleasing appearance, forming long swelling hills of great elevation, covered frequently to the top, with the light green dwarf birch, and interspersed with different kinds of fir, which, at intervals, along the extreme verge of the heights, are seen ranging far above the low birch growth.

At the head of this smooth water, are the Rocher Capitaine rapids, the lower part of them going by the name of the Caribou. They form altogether an interruption of about a mile and a half, in which, however, there is some smooth water, nor is the rapid generally very heavy, being ascended by canoes, excepting one or two furlongs near the middle, where there is a portage on the south side.—At the lower end of this portage is one of the finest scenes of rapid water on the Ottawa. The whole of its waters are, for some distance, condensed into a channel four or five hundred feet in breadth, the foot of which is crossed by a range of rocks, extending from the north shore, and

terminated by one of superior size, about an acre in extent. Against these the river is precipitated with a force which completely curves the surface of its channel several feet from the horizontal, and thus forced abruptly to the right, it descends in great heavy swells, through a pass two or three hundred feet wide, curling up into fierce breakers, when fairly clear of the strait. Below this, is a smooth deep basin, of a circular shape, by which the water, now streaked with foam, wheels swiftly round the Rocher Capitaine, and recommences its rapid course along the base of the rocks, which had intercepted its progress.

Above the Rocher Capitaine, is a free navigation about ten miles to the Deux Rivières rapids, the character of both the river and the shores continuing much the same as before. Towards the upper end of this stream, the channel gradually narrows, until it is scarce a furlong wide; winding along the base of the ridge, which is here precipitous to the height of four or five hundred feet immediately from the water. For a short space here, ice never forms, which is rather unaccountable, as the current is not of remarkable strength. The channel must of course be very deep, and it is strewed with bowlders, some of which, from the depth at which they approach the surface, appear of immense size. Beyond this confined place the river widens, a little below the Deux Rivières rapids; and we find that we are no longer skirting the foot of the heights, but fairly proceeding into the heart of them, the channel being now lined with high barren hills on both sides.

At the Deux Rivières, the Ottawa breaks through the ridge, along the base of which, it afterwards flows for about one hundred and fifty miles. It cannot be said to descend from these heights, as the whole fall here is cer-

mainly not more than forty feet, and above this the channel is smooth for upwards of twenty miles, so that the separation of the Upper and Lower Canada highlands is complete.

The main descent at the Deux Rivières is in a heavy continued rapid, for about one-third of a mile. Above this are two or three short detached rapids, for about a mile and a half, which are ascended, without a portage, excepting the last, called the Dicharge of the Trou, where part of the lading is carried. We did not pass up to the still water, our inland route striking off a little below the Trou. I had however, the satisfaction of a distant view of the rough water there; the last until we approach the mouth of the Little river, which forms the eastern part of the Nipissing route to Lake Huron. This point, (about twenty-five miles above the Trou) is commonly called the Matawoen, or forks, from the particular form of the neighboring parts of the Ottawa. Above the Deux Rivières, the heights fall back from the water on both sides, and the whole vicinity of the Ottawa appears to part with much of its rough and sterile aspect; but the view of the lower grounds was too imperfect to enable me to speak decidedly as to their nature.

In case of the navigation ever being completed on this line to the Huron, the improvement of the four rapid spaces between lake Coulonge and the Little river, will probably form the most difficult portion of the undertaking. The obstacles, however, do not appear to be unusually great, notwithstanding the mountainous nature of the country.—On both sides of the different rapids, are generally spaces of low ground, the stone near the surface appearing chiefly to consist of bowlders, so that the necessary excavations would not be very deep, or of the most difficult nature.—

The rock along this part of the route, is of the same description as that of the neighboring heights, which appear to be entirely composed of varieties of granite. Near the river it differs much in its appearance, being sometimes round and solid, often broken and craggy, and in some places lying in regular beds, dipping towards the water.

The distance of the Matawoen from Bytown, (by the route of the Quelle Butte,) I conceive to be abount one hundred and eighty miles, which would, of course, make the whole distance from Montreal not more than three hundred. It has hitherto been commonly stated to be four hundred miles, but there has been a most extraordinary system of exaggeration, in estimating every inch of this route. The Deep river, for example, which is called twelve leagues, we only took seven hours and a half to ascend, paddling leisurely; and therefore I am confident it is not more than eight and a half, for the stream is less rapid here than in any part of the river, and, as may be expected, the exaggerations increase with the current.

In this space of one hundred and eighty miles, we have seen that there are seven main interruptions. First, the Chaudière rapids, in all five miles; the *Chats*, two miles; the Calumet rapids, about six and a half miles, and perhaps two more by the channel; the Quelle Butte, about one mile and a quarter; the Deux Joachims, about three quarters of a mile, by the portage; the Rocher Capitaine, about one mile and a half; and the Deux Rivières, two miles.

If there is any use in guess work, I should say that the descent of the four last mentioned is rather less than that of the three first, and does not surpass two hundred feet.—The Quelle Butte has decidedly the smallest fall of the

four; and the three higher rapids appear to divide the remaining ascent pretty equally. The particular distribution of the declivity along the Ottawa, is not, however, a very material point of interest. From every account of the Nipissing route across the country, I am satisfied that the Ottawa, near the Matawoen, is yet below the surface of lake Huron; so that, be the respective heights of these rapids more or less, they still form but necessary steps in this grand natural stair, to the level of the western waters.

From the foot of the Deep river, the Ottawa averages nearly an E.S.E. course to the Deux Rivières, above which, as I could see from the range of the heights, it flows much in the same course for many miles, continually narrowing the Huron side of the country, until reaching the Matawoen, where the River takes an abrupt and decided turn, in a more northerly direction; thus, as it were directing towards the true point of its junction with the waters of that great lake.

Before leaving the des Allumettes, I had not the smallest idea of the Ottawa forming, above that point, a practicable route for navigation to the westward; but after passing through the country from the Deux Rivières to Penetanguishine, and returning across the sources of the Madawaska to the des Allumettes, I can say without hesitation, that it is vain to look for any other northward of the Rideau. From the Deux Rivières, the high stony ridge (which is merely the face of the elevated interior lands) continues without interruption far to the south, presenting, every where, a hopelesss barrier towards the Huron, at least for the common system of lockage. The passage through this ridge, by the Ottawa, has of course its minor difficulties; but in the grand essentials of a proper elevation of channel,

and suitable direction, this fine river, without a doubt, is almost every thing we could wish. The adoption of this route would lead to a part of lake Huron, considerably to the north of that, towards which researches have not yet been directed; but this surely is no objection. As a point of general communication, the outlet of the French river appears unequalled on the lake; and the route, from its northern direction, would benefit a much greater portion of the country than any other line of improvement which has been contemplated.

When once the ridge of the heights is fairly passed by the gorge of the Ottawa, there is every reason to believe that no insurmountable obstacles remain. For many miles on the Upper Canada side, the highlands are nearly in the same form as on the other, soon declining back from the ridge seen from the Ottawa and of course to lake Nipissing and the sources of the Little river, both of which receive considerable accession of water from the south.—From the general figure of the country, therefore, we may expect these waters to occupy a comparatively low line through it, and every information I have been able to obtain, has contributed to confirm this idea. I saw no part of the Nipissing route, but after traversing the high country in the direction of Penetanguishine, my inquiries were naturally turned to the northward. The following particulars are the result, and may be depended upon as generally correct, having been corroborated from various quarters.

On the French River, there are only three obstructions, where it is indispensible to make portages. The first is the Recollet, eight to twelve miles from the outlet. It is a fall fifteen or twenty feet high, with hardly any addition of rapid

water. The Parisienne is the second, a short heavy rapid, the portage of which is not a furlong in length. And the Chaudière, consisting of several small falls, immediately at the outlet of lake Nipissing. Besides these, are four rapids, which are generally ascended without carrying the canoes, and always run down. From every thing I can learn of these interruptions, they cannot altogether form a descent of one hundred and fifty feet. East of lake Nipissing, the route leads over a level fertile tract, about eight miles to the Turtle lakes, two considerable pieces of water, which form the chief sources of the Little river.— At each extremity of this distance, are carrying places, between one and two miles in length, called the Portages de Vase ; and along the intervening space, a small stream is rendered navigable for canoes by a dam a few feet in height, which throws back the water for five or six miles. This circumstance goes far to prove the flatness of the tract, and the name of the two portages gives an idea of their nature. They are invariably described as leading over a rich deep soil, with little sensible elevation either way. The portage leading to the Turtle lakes, of course forms the height of land, which cannot be supposed to be fifty feet above lake Nipissing, and the whole ascent from lake Huron would thus appear to be under two hundred feet.

I may here remark, that whatever be the exact elevation of this summit, it certainly is not one-third of that sixty or seventy miles southward, on the route of the Nesswabic and Muskoka, which I followed in crossing the country.— On the latter river, there are not less than thirty-five portages, at three of which are falls, of about seventy, fifty, and thirty feet, besides not less than a dozen falls from ten to twenty feet in height. The source of the

Muskoka, is probably between six and seven hundred feet above the level of lake Huron. From the descent of this river being chiefly in falls, I had, with the assistance of a pocket level, a good opportunity of forming an opinion.

From the Turtle lakes to the mouth of the Little river, are about ten portages, all of moderate length. At two of them, are said to be falls of fifteen or twenty feet, and the rest are along the side of small falls and rapids, which, at several places, would not occasion any carrying, if there was a larger stream of water. In addition to these, are three or four more gentle rapids, ascended by polling. The whole together can hardly fail to compose a somewhat greater descent than those on the western side of the route, and therefore the smooth water of the Ottawa, above the Deux Rivières, is, with little doubt, below the surface of lake Huron.

The length of the French river is stated to be seventy miles; the route, through lake Nipissing, thirty to forty miles; and from thence to the Ottawa, about fifty. But here also, the actual distances will probably be found much less than usually stated by common account. On the latest charts, the mouth of the French river appears nearly in latitude 46° and longitude 80° 45′. From various data, the Matawoen cannot be far from latitude 46° 30′, and longitude 78° 45′. With a considerable allowance, then, for winding, though the route is said to be generally a direct one, it cannot altogether much exceed one hundred and twenty miles; making the whole distance on this line from Montreal to the Huron, under four hundred and fifty miles.

The country along the Nipissing route, will, I am persuaded, be found of a very different nature from what has been commonly reported. To the south particularly, the

greatest part of the distance, from every thing I could learn, consists of good lands extending far up the country, in fact to the neighborhood of the line in which I crossed it. It is probable enough that the immediate coasts along the route are generally rough; but this affords no proof that the country beyond them continues so for half a mile.—Even the shores, however, are not often visible along lake Nipissing and the French river, on account of the numerous islands. The latter, in particular, which has usually a channel of great breadth, is described to be full of rocky islands nearly from one end to the other, which may in some measure account for the character of peculiar sterility which it has received. But even here, I am assured, that good soil is found along the bays, and appearing to extend far inland.

Of the country farther eastward, I have been able to obtain more distinct information. To the south of lake Nipissing is a great level tract, abounding in a rich heavy soil, and extending, with little rise, many miles southward. These lands are traversed by two considerable streams, the largest, called the South river, entering lake Nipissing, not far from the outlet. As far as I could hear, this river has a course, of eighty or one hundred miles, nearly north. The source is near that of a northern branch of the Muskoka, and by this route canoes sometimes cross the country towards Penetanguishine: about four days are required to reach the source of the South river.. The first fifteen or twenty miles is described to be without rapids; and through very fine lands, which, indeed, continue more than half way up its course, and on the upper parts of the river, the lands, though inferior, are said to be still perfectly habitable.

The accounts are not so favorable of the north shores of lake Nipissing, though there are said to be some considerable tracts of good land towards the eastern end. On the upper parts of the Little river, a great proportion of the lands will be found fit for settlement, particularly in the neighborhood of the Turtle lakes. The nature of the route leading between them and lake Nipissing, has already been described, and a little to the north, between the same lakes, is a winter path about fifteen miles in length, also through a fertile level tract. A rich deep soil is said to be generally prevalent in these parts, timbered chiefly with maple, bass-wood, and elm.

Had I obtained no distinct account of these lands, occupying the great valley of the Nipissing, it would seem hardly possible to conceive them to be generally barren (as is commonly stated), when we know that after gradually ascending southward, to a superior elevation, of at least four hundred feet, luxuriant hard-woods are found to extend uninterruptedly across the country.

I now proceed to describe the routes which we followed between Penetanguishine and the Ottawa.

From the Deux Rivières, which I left on the 30th of August, a gradually rising tract of barren sand is crossed, by a most harrassing portage of three or four miles, which, in many places, can hardly be traced through the thickets. It leads to a small lake, the water of which runs to the Deux Rivières rapids. This was the only place in the whole journey, where I observed leeches; they were in great abundance of two kinds, one of a dark red colour, the other greenish, with yellow spots on the back. After making another portage of about half a mile, the same stream of water, is followed three or four miles through a large

beaver meadow. The stream is only about fifteen feet in breadth, excessively winding, and so overgrown with alder bushes, as to require almost constant exertion to force a canoe through them. From this stream, a portage of about a mile, over a nearly barren hill of solid granite, brings us fairly to the top of the ridge, and to the first waters of the Nesswabic, which are not more than ten miles distant from the Ottawa, It occupied us, however, nearly three days to reach this point; such was the difficulty both of finding and following this almost trackless route.

From this to the main channel of the Nesswabic, the course of the water is very direct, about fifteen miles, consisting of a succession of small lakes and ponds, with short swift channels between them, there being ten portages altogether from the Ottawa, all little tracked, and most of them with rough and dangerous footing. The appearance of some of these lakes is pretty enough, but all around denotes barrenness. The route continues from the Ottawa, closely along the ridge of the highlands, to the Nesswabic, which is entered at an oval extension of its channel, near three miles long and one and a half broad, called the Trout Lake. Still no good land is in view; but near the verge of a moderate rise, along the west side of the lake, the hard-woods commence, and continue inland with little interruption. The immediate shores, however, of the river, are barren for some miles farther.

The Trout lake lays about thirty-five miles, nearly west from the head of the lake des Allumettes. By the river, the distance appears to be about fifty miles, in which there cannot be less much less than six hundred feet of fall.—Canoes can easily descend from the Trout lake to the des

Allumettes in two days, and on my return I followed this route. There are about twenty short portages altogether, eleven of which are within eight miles of the Trout lake, passing a number of small falls and some rapids. The remaining descent is almost entirely in rapids, forming an expeditious route downwards, but rather hazardous, from the rugged nature of the channel. About fifteen miles from its mouth, the river forms a smooth broad channel, ten or twelve miles in length; and, about ten miles below the Trout lake, another expansion for four or five miles, called Lake Traverse. With these two exceptions, there is not three miles together of quiet water in the whole of this river.

From Trout lake half way down, the Nesswabic winds its course entirely through masses of rock. Nearer its mouth the banks are less elevated, with some soil of a poor sandy nature. Both above and below the Trout lake, the shores of this river present a considerable elevation towards the Ottawa. About the outlet of this piece of water, for a short way, there is very little rise visible in that direction, nor can there be much, as the Maskinongé valley is only a few miles distant. This seems to be the only pass through the ridge by which a communication can be easily formed towards the interior.

Ten miles below Trout lake, the north shore rises into steep hills of solid, and often bare rock, upwards of three hundred feet high, which closely follow the river for about twenty miles. From one of these hills, about half way to the des Allumettes, I obtained an extensive view to the south. Every where appears a succession of small round hills; rock, or sand at the best, densely covered with fir, chiefly red pine and tamarack, thinly interspersed with

birch and oak bushes, which, in autumn, assume tints of the brightest yellow and red. The highest and most distant land in view was to the south-west, some where between the Pittowais lake and the Madawaska river.

The view towards the Maskinongé valley was confined by the neighboring heights, but the high northern shores of the Ottawa (about the head of the Deep river) were visible for a short way, ranging nearly parallel with the Nesswabic, and to my surprise not more than fifteen miles distant. I was not previously aware of the great proximity of the two rivers, which, in fact, are never more than twenty miles asunder, until the Nesswabic spreads itself over the table lands, and this sight at last fully convinced me of the futility of searching for canal routs up these furious mountain streams, while the spacious channel of of the Ottawa, calmly dividing the highlands far below any of them, continues its course nearly direct from the desired point.

From the Pittowais upwards, the Nesswabic is joined by no stream of any consequence, for probably forty miles, until within three or four miles of the Trout lake. Here a small tributary flows in from the south, on which, about twelve miles distant, is a considerable lake called la Vieille, and by these the route strikes off which crosses the sources of the Madawaska. The Vieille branch forms hereabouts, nearly the division between the hard-wood and fir countries. No good lands, indeed, are seen on the stream, but they commence at no great distance from it.

From the Trout lake, the Nesswabic continues in a westerly direction amidst broken stony shores, and interrupted by several heavy rapids, the ascent being hardly less than eighty or ninety feet, in the space of four or five

miles, which brings us to the Cedar lake. This piece of water may be considered the grand reservoir of the river, the main channel terminating here, and several inferior streams branching off in various directions, collecting the waters of numbers of smaller basins. As far as I could ascertain, the south-western branch, which we followed, is the largest, but it does not appear to discharge one-third of the water which flows from the outlet of the Cedar lake.

Our route did not enable me to see more than twelve miles of the length of this lake, but it has the appearance of extending much farther than this, in a winding course, generally about westerly, and from one to two miles in breadth. On the lower part of the lake, the lands, which now form a gradual ascent from the water, are still covered with pine, cedar, &c. but on proceeding upward, this is succeeded by considerable tracts of hard-wood, which are separated by other spaces covered with fir, and this seems to be the general character of the western end.

At the Cedar lake, I remained nearly three days, partly delayed by bad weather, but chiefly waiting the arrival of a son of the Algonquin chief, named Constant Pennaissez, who had established his hunting winter quarters here.—From him I received an excellent chart, which delineated the route as far as his hunting bounds extended, nearly to the source of the Nesswabic; but he could give no distinct information as to the the situation of the portages crossing the height of land. From Constant I learned that there was a much better route from the Ottawa thus far, than that which I had followed. It is by a stream entering the Cedar lake, from the north, and communicating with another, called after the Indian who hunts upon it, Map di

Fong's creek, flowing into the Little river. This, though the longest, is much the smoothest route, and is always followed by the Indians passing between the Ottawa and the Cedar lake, with loaded canoes. It would have been much the most interesting route for me, had I known of it in time.

One of my men having become quite lame from a hurt in his foot, was obliged to remain at the Cedar lake. This determined me to proceed with the four remaining hands in one canoe, taking only about twenty days provisions, and otherwise as light as possible. I was in hopes of being able to return in that time, but the man was instructed not to move farther than the Trout lake with our provisions and canoe for at least thirty days, and if we had not then made our appearance, he was allowed to make the best of his way. In the mean time his quarters were comfortable enough, being on a most excellent fishing station, and in the neighborhood of the friendly Pennaissez.

There is still a continuation of rapids for four or five miles on the small river, which we now began to ascend. To surmount these, a good wide portage road has been formed north of the channel, through a stony hard-wood tract, in which three small lakes are crossed, and this at length brings us to the elevated country. Hard-wood now appears to be the general growth wherever a view is obtained a few hundred yards inland beyond the firs and cedars, which here, as in other parts of Canada, commonly skirt the waters.

There is, however, little extent of rising ground to be seen from this stream of water, the hollow which it occupies forming but a trivial interruption to the general level face of the country. In a few miles it ceases to have a regular

river channel, being merely the connection of a range of lakes, extending nearly south through the table land. Of these, there are four principal, and several smaller ones, some of them only separated by narrow still channels, and others by short swift streams of inconsiderable descent.—The largest of these lakes do not appear to extend six miles in any direction, though the route did not always enable me to judge exactly of their size. They vary much in shape, several being deeply indented with bays, and others finely checquered with islands. The shores are invariably bold, though hardly ever precipitous, but rising one or two hundred feet into gentle hills, and long swelling ridges, covered with the finest hard-wood, generally with a small mixture of white pine.

The scenery is of the most pleasant and inviting nature, totally differing from the wild romantic views along the Ottawa, and indeed from any thing I had before seen in the country. It is rare, in the uncultivated parts of Canada, to see beauty and fertility combined. Generally the richest lands have a dreary, and, often too truly, an unhealthy aspect. Here, amidst the most enlivening scenery, there is every appearance of fertility; and both from the nature of the soil and waters, an assurance of the country being of the most healthy nature.

White pine abounds across the whole country in the greatest perfection. Red pine is not seen on this route after leaving the Cedar lake; nor did I observe a single white oak, from the neighborhood of the Ottawa, until approaching lake Huron. Maple is the principal tree about here, perhaps composing half the forest. Birch and beech are in about equal proportions, and bass-wood and elm rather more rare.

The whole of the lakes, not only here but in every part of our routes, are deep and clear, (shoal, or rushy shores being seldom seen) and they seem generally to be stocked with fish of various sorts and excellent quality. In this particular, the waters of the Nesswabic surpass those of any other river I have seen in the country. In its larger lakes, eels and catfish are taken, of a size and plumpness seldom seen in the Ottawa; but the most noted fish is called the white trout, which is caught in abundance, both winter and summer, frequently forty pounds in weight. It is of a light silvery hue, and cream-coloured in the flesh, but in shape and flavor resembles the common speckled trout, which is also plentiful in the same water. Neither of these kinds are found in the Grand river.

The range of lakes above described continues for about twenty-five miles, beyond which the stream winds through an open marsh of considerable size, and the first thing of the kind we had met with. Here it divides into two branches, and our chart directed us up the most northerly. About two miles from the swamp, this channel begins to make a considerable ascent, being interrupted by several small rapids and a fall twelve or fifteen feet high, within the space of a few miles. The route here is extremely tedious, from the scarcity of water, and number of fallen trees. To the south of the stream, the shores are broken and frequently swampy: but we were now close upon the division of the waters, and some interruption to the fertility was to be expected. On the north side the lands still continue good. Five or six miles from the swamp, after ascending a steep rise, upwards of one hundred feet, I found a plain of excellent loam, and apparently very extensive.

At length the stream opens into a deep round basin, about

a furlong across, and from this, a long straight passage, with bold hard-wood shores of the finest foliage, gradually tapers to the breadth of thirty or forty feet, through which, at the distance of about a mile are seen the shores of a more extensive sheet of water—altogether it is a curious and beautiful scene. The northern shores of this lake have even a richer appearance than any thing I had yet met with. After rising somewhat abruptly to a height of sixty or eighty feet, they continue in a level sweep round the lake, covered with the most luxuriant maple woods, and without any pine. Though the bed of the water has here risen considerably, yet the adjoining land is not higher than that along the range of lakes farther down the river; and there is every appearance of the ground to the northward continuing on a fertile level, to the streams flowing towards lake Nipissing, which are only a few miles distant.

The lake which we had now reached, is within the Mississagua hunting bounds, and along the south shore, I was directed to look for the portages leading to the Huron waters. From the Cedar lake, thus far, it had proved a three days' journey, travelling leisurely, though, by the help of Constant's chart, without much delay in tracing out the route. After a little searching we found a portage-path which led to a small lake, and from thence ascending a brook still belonging to the eastern waters, we soon arrived at another carrying place, which, from its westerly direction, and being distinctly tracked and marked, I did not doubt to be the proper route. Having proceeded along it nearly a mile, we were met by an Indian, only the second we had seen since leaving the Ottawa. It could not have occurred in better time, for I now found that we had missed the main route, and begun to follow an interior hunting track.

After retracing our way for a little, the Indian conducted us to an extensive piece of water, which he called Otter lake. Its waters run into the Nesswabic by the most southerly of the two branches, meeting at the swamp before spoken of, and which is only five or six miles distant from Otter lake. Of course this southerly branch should have been our route; but I had no reason to regret our wandering, as it was the means of throwing us in the way of this Indian, without whose information we must have incurred much more serious delay.

He was one of the Iroquois tribe, who reside with the Algonquins, at the Lake of the Two Mountains. They are generally robust enterprising fellows; and, having no hunting territory of their own, frequently ascend the Ottawa, and passing over the grounds of their Algonquin friends, make free with the beavers and otters, on those of the Mississaguas. These Iroquois, from their roving habits, are the best guides through this part of the country. The hunter we had fallen in with, and his father, had been rambling round this neighborhood for a twelve month, and described it as *bonne terre partout partout*, and every where abounding with small lakes. A few hours journey northward from the lake, on the northern branch of the Nesswabic, (and the shores of which are above described as peculiarly fertile) he says the streams run off in a northwesterly direction, and no doubt it must be to the south river, so that it seems almost certain that there is no material alteration in the nature of the country, before reaching the waters running into lake Nipissing. Indeed, from every thing that came under my observation, there appears to be no distinct continuation of heights dividing these level tracts, either towards the north or the west.

A few weeks previous to our meeting with the Iroquois, he had made an excursion to Penetanguishine, and I now learned that a few miles more would bring us to the head of a considerable river, running in that direction. With the lowest part of this river, however, he was not acquainted, having left it some distance above the mouth, by a route crossing to the Severn. I procured from him a chart of his whole journey, as near as he could recollect it, and also a sketch of the various streams of waters forming the heads of the rivers, running both ways from this vicinity.

Round Otter lake the lands have very little rise and are timbered with hard-wood and a considerable mixture of white pine. Where we chanced to encamp, the soil was very good and free from stones. From this lake their is no further ascent on the waters, in the direction we now proceeded. A still channel, in places scarcely twice the breadth of the canoe, winds for a mile or two through a tamarac swamp, and ends in a basin of a remarkably circular shape, near a quarter of a mile in diameter. I think it probable that, at some points, this swamp continues uninterrupted to the first western stream, not a mile distant; but, on the route, the marsh is crossed by a sandy bank, twenty to thirty feet high, and about fifty paces over, and close to the round pond, from which is a miserable sinking portage, of half a mile to the first Huron water, a deep pool two or three acres in extent. The surface of this was raised to its utmost brim, by a beaver dam near the outlet, which accounted for the wet and yielding nature of the portage. The beavers have, in fact, nearly effected the junction of the Huron and Ottawa waters.

After crossing this pond, there is a further portage of about three quarters of a mile, over an uneven rocky tract,

to a lake appearing to be of considerable extent to the right of our rout, and from which flows the river which was to bear us to lake Huron. It is here a fine clear stream, with a gravelly channel, twenty or thirty feet wide, and already with sufficient water, even in the dry season in which I passed, for the easy navigation of a three-fathomed canoe, excepting at a few rippling shoals. This river, by the traders, is called the Muskoka, after the Mississagua chief, who hunts in some part of its neighborhood. The Indians have some other name for it, which I could not learn.

The nature of the rock thus far across the country, is much the same as on the ridges along the Ottawa, and on the Muskoka it continues so quite to lake Huron; the shores and numerous islands of which, near the mouths of this river, as far as I can judge, being of the same granite composition as the Ottawa heights. The different parts of the routes, however, present considerable variety in the rock. On the lower main channel of the Nesswabic, it generally lies in round compact masses of a redish hue, without any regular vein. On approaching the Cedar lake it is dark coloured, and strewed along the shore in angular fractures. From that lake to the height, the surface stone near the Nesswabic chiefly consists of dark coloured bowlders. On the Peonga (or Madawaska route), more solid rock is met with, still of the same kind, but various in its appearance.

On the western descent of the country, there is yet more variety in the granite. It assumes different shades, is sometimes craggy and angular, but more frequently, as on the Huron shore, lying in round solid masses. Nearly from the source of the Muskoka, it is seen at intervals in

smooth beds, or layers, from six inches to four feet thick, and generally dipping to the south-west. I observed no limestone on any part of these routes, from the Ottawa until reaching Penetanguishine bay, where it appears in abundance.

About the first lake on the Muskoka, the shores are rocky and fir-timbered, and they continue so for a mile or two farther down the stream. In half a mile it touches upon another piece of water, extending to the left, and a mile further, after passing a fall two or three feet high, is a very picturesque lake, extending also to the left, apparently several miles. Here the country resumes its fertile appearance, and retains it, with some inconsiderable exceptions, to the mouth of the river. Immediately beyond this lake, is a short rapid and portage, a little below which, the river is joined by a considerable stream from the north, and soon after enters a fine open piece of water, about two miles in extent. Within three miles below this, are two more small lakes, and from this point, which is about twelve miles from the first basin, the water ceases to widen out in this way, now forming a regular river channel, in which are only three more lakes on the whole course.

A little above the lowest of these basins, the Madawaska route, by which we recrossed the country, strikes off from the channel of the Muskoka, and to prevent recurrence may be here described.

On leaving the latter stream, this route follows a chain of small lakes, extending nearly eastward. The height dividing the waters of the two rivers, is between the second and third of these ponds, only about four miles from the Muskoka; and to this point the ascent appears very con-

siderable, probably exceeding one hundred and fifty feet. The stream from these lakes is soon joined by another from the south, and forms a western branch of the Madawaska, which is followed for some way. On this part of the route, the country is very pleasant, consisting of a succession of hard-wood hills of moderate declivity, and the portages are generally over an excellent soil, though often encumbered with loose stones. As we descend the waters of the Madawaska, these favorable appearances begin to give way. Swamps and rocky ridges become frequent near the river, and the pine gradually thickens on the hils. In short, the whole country seems decidedly to change for the worse.

About twenty miles from the Muskoka, the route leaves this branch, and bearing more northerly, proceeds seven or eight miles across a poor stony tract, by several small lakes and rough ill tracked portages. The last of these, not less than three miles long, over rather better soil, conducts to the Abeunga, or, as commonly pronounced, Peonga lakes, which are among the finest in the interior, and form the principal reservoirs of the Madawaska river. The first lake of this name extends northerly, in a winding direction, one or two miles broad, but of the length I could form no idea, as the route only passes up it, about four miles to the outlet, near which there is a trading house belonging to the Company, occupied in the hunting season. After gliding down a swift clear stream, for two or three hundred feet, the second Peonga lake opens to the view, four or five miles in extent, to the north-east, and with a considerable breadth, though its appearance is much diminished by a hard-wood island, containing some hundred acres.

To the north of these lakes, are long, sloping, rising

grounds, between one and two hundred feet high, and of the most fertile appearance. To the south, the country is much in the same form, but covered with firs and birch.—Indeed this route, by the Peonga lakes, with the exception of the first fifteen miles from the Muskoka, appears to be nearly the division line between the hard-wood and fir regions.

There is still another lake of the same name, separated from the others in a similar way, by a short swift stream; but we did not enter it, our route leading off from the middle basin. North-westerly, through two small lakes, still discharging into the Madawaska, and from thence, by a portage of four miles, over a miserable soil, we reached the waters of the Nesswabic at lac Clair, a pretty piece of water, but with sterile looking shores, and appearing to extend about four miles north and south. This is only separated from lac la Vieille by a stream and portage not a furlong in length. The route passes closely up the eastern side of the Vieille lake, about three miles to the outlet. The lake appears to extend much farther to the north; but from the numerous islands, I could obtain no distinct view of its size, in any direction. To the north and west the lands appear good, and here also are some trading huts, only occupied in the winter. As before mentioned, the Vieille stream joins the Nesswabic about twelve miles below this lake. In this space it forms no basins of any consequence, and has many rapids. In one place there is a portage of more than two miles, cutting off a great rapid bend in the stream.

On the whole, the Peonga route is a most harrassing one. It leads over much higher ground than the more northerly route, by the source of the Nesswabic, and is in

every respect less eligible. The whole distance from where we leave the Muskoka, to the mouth of the Vieille stream, appears about fifty miles, and in this space there is no less than three dividing heights of land, and altogether thirty portages, three of them between two and four miles long, and several exceeding one mile. Nineteen lakes, great and small, are crossed.

I now return to the Muskoka :—As already noticed, this river ceases to widen out into lakes, about twelve miles from the first one on the route, and from this point it continues to flow in a regular channel for about twenty miles. On the first seven or eight miles of this space, there are several small rapids, and for the ensuing ten or twelve, is a smooth stream, winding in a most extraordinary manner, through a level sandy valley, timbered chiefly with balsam, tamarac, and poplar, beyond which, however, the hard-wood rising grounds are seen, seldom a mile distant on either side. The river here is of a very uniform breadth, from sixty to eighty feet; the depth is six feet and upwards quite across the channel, and the current about one mile per hour.

This winding channel is terminated by a great and sudden descent in the river. First is a little rapid water, and then succeeds a fall, nearly perpendicular, of about thirty feet. Below this are some rapids, for half a mile, which suddenly and in a great slanting fall, descending perhaps fifty feet. Neither of the portages at these falls exceed a furlong in length. On the lower one is a curious variety of the rock. When broken, it is of a light carmine colour, and resembling free-stone in the grain. Not much of it is seen above ground, but it appears to be in regular beds, three or four feet thick, and though rather hard

near the surface, it would probably be found, on more thorough examination, a fit and beautiful material for building.

These falls may be considered as the western verge of the interior table lands. In a direct line this point is probably about twenty miles from the division of the waters. The route of the Muskoka, thus far, continues nearly in the same direction as that on the upper parts of the Nesswabic, and the whole direct breadth of the level country on this route appears to be about fifty miles. The perpendicular rise within this space, from either side to the height of land, I should not suppose to exceed seventy feet.

The streams running in every direction from these uplands, have a much more steady supply of water, and are far purer than the lower tributaries of the Ottawa. The channels are generally very moderate in breadth, appearing to be little troubled with floods, which, from the marks along the shores, seldom seem to rise above two feet (perpendicularly) in the streams, and fifteen or eighteen inches in the lakes. These favorable distinctions are readily accounted for in the form and nature of this interior country, consisting of a vast level, generally with a light free soil devoid of marsh, and interspersed with hundreds of small deep reservoirs, retaining and refining the water again and again, before it passes to the main rivers.

The singular facilities which this plain country possesses for water communication, within itself, must be evident. Were there any possibility of leading a population into it, the channels and basins of still water, intersecting it in every direction, might quickly be completed into a ramification of water ways, which for general utility, and natural beauty could scarcely find a parallel. Sufficiently

deep and expansive for the largest steam-boat, and yet too small, or too well sheltered by the bold shores, to be dangerous for the smallest skiff. But without some main line of navigation from the inhabited parts of Canada, this pleasant and commodious region must, for obvious reasons, remain a desert.

In less than half a mile below the great fall, a narrow lake is entered, which appears to extend a number of miles north and south, along the base of the ridge, but we saw neither extremity, merely passing with the flow of the water about a mile across the middle of the lake. From hence the river continues a rapid descent for abont eight miles, through fine hard-wood forests to the next lake. In this space the fall, which must be considerable, is principally in rapids, it being the only part of the river where there is any considerable descent of this kind.

The piece of water to which this leads, with its surrounding shores, is the finest in appearance which we met with. It extends about ten miles nearly south, and towards the lower part is a wide inlet to the east, much farther than I could distinguish. Several islands of various sizes, rise boldly from the water, and in the entrance of the great eastern bay, just mentioned, there is one appearing to contain three or four hundred acres of good land. On the west, the shores rise quickly to a considerable height, timbered with hard-wood and white pine. On the east, they form a long gradual slope of the richest appearance, and without a fir for miles.

A large southern branch of these waters flows into the eastern arm of this lake. Its course is through several considerable lakes, and by it canoes may pass to the Trent or lake Simcoe. I did not see this branch, but was informed

of it by a trader well acquainted with this vicinity. He further asserted that saltpetre is found on a certain part of the stream, not far from its mouth. The fine central basin which receives these rivers appears to have been long a principal station of the traders. There are here vestiges of two old establishments, besides a commodious house in good repair, but deserted when we passed.

The Muskoka flows from the southern extremity of the lake, apparently doubled in size. It is now from one to two hundred feet wide, containing about as much water as the Rideau, and continually interrupted by small falls, with here and there a short rapid, among which obstructions there is seldom four miles of still water together. The channel between the falls is alternately composed of sand and a firm compact gravel. The portages, which are now well tracked, are generally over even ground, the shores of the river being seldom rough or precipitous, even near the falls and rapids. Considering the great descent of the country, the canoe route is as good as could be looked for, consisting, with little exception, of smooth runs and short portages, and this continues to be its character to the end. In returning we made our way up the river about as expeditiously as we had descended.

This succession of small falls continues for about twenty miles from the Trading lake, when the river again makes a great and sudden descent. There are first two falls, from fifteen to twenty feet in height, and then a sloping fall of of sixty or seventy, all within a quarter of a mile, and in a straight range down the ridge, forming together a wild interesting scene. A little below this, the river is joined by a large branch from the north, and it now winds gently with a broad deep and still channel to its last and largest

lake, about six miles distant from the great fall.

There are altogether fourteen portages on this river, and the difference in level of the two lakes, is, I think, about two hundred and fifty feet. The channel here is not remarkably winding except at two points, for a few miles. The course continues much the same as on the upper parts of the river, averaging about S. S. W. until half way between the lakes, when it makes a decided turn nearly westward for the remaining part of the route. The lands retain their promising appearance along this part of the river, being almost every where covered with timber of nearly the same description as that in the centre of the country. In returning I examined the vicinity of most of the portages, and almost invariably found a light soil of fair quality, though frequently uneven and strong, as might be expected near the falls.

The large stream which flows in from the north at the lower part of this run, is the same by which, and the south river, (as before hinted) there is a canoe route to lake Nipissing. On a lake about two days journey up this branch, is a trading station to which the common route is, not by the Muskoka, but along a considerable river flowing out of, or through a large lake not far to the westward of the station, and entering lake Huron, (as I am told,) about thirty miles from the French river. It is called the Neyetewa, and the country along its upper parts, and on the northern branch of the Muskoka, is said to be much of the same nature as that which we passed through.

The last Muskoka lake is a great body of water extending chiefly north-westerly, and containing hundreds of islands, some of them very large, but appearing mostly barren. From the entrance of the river, the route runs westerly

through the islands, about ten miles to the outlet of the lake, which we found without much delay, having fortunately met with an Indian, (only the third we had seen,) the night before, who directed us how to steer, and but for this, we should, in all probability, have spent days in searching for it. It was impossible to form any idea of the extent of this piece of water to the northward, on account of the multitude of islands. To the south west, it extends about ten miles from the outlet. In this direction it is less crowded with islands, and has a fine appearance. Where the main shores could be distinguished, they generally seemed to be of a habitable nature, continuing round the water in an even moderate elevation, with, however, a greater proportion of white pine than I had before usually observed. At the lower end of the lake, the appearance is not favorable, the growth, as far as seen, being of the fir kind.

From the southern extremity of the lake to the Severn river, the distance is only eight or nine miles, and over this space is the common route by which the fur traders reach the waters of the Muskoka. From the lake is a portage of about three miles, leading to a rivulet which passes through two small lakes, and enters the Severn, half a mile above the fifth portage from Penetanguishine bay. On my return I ascended the Severn and regained the Muskoka by this route. The long portage, close to the large lake, is mostly over a good, though uneven soil, but from that to the Severn, the country gradually assumes a barren aspect. Along this river from the fifth portage to its mouth, a distance of fifteen or sixteen miles, the shores are uniformly barren, consisting, in fact, generally of solid rock, even on the smooth water. The limestone of

Penetanguishine bay does not extend up the Severn, the stone of this river appearing exactly of the same nature as along the Muskoka. Both streams evidently flow from the same ridge of country, though the sources of the Severn, are without doubt in a much lower part of it. The elevation, however, of lake Simcoe above the Huron, must be considerable, there being seven portages altogether to this lake, and five of these which I passed, certainly form an ascent not far from one hundred and twenty or thirty feet.

At the outlet of the large Muskoka lake, is a fine fall sixteen or tweenty feet high, with a heavy body of water. The river now appears to contain considerably more water than the Severn, and probably three times as much as the Rideau. A mile or two below this fall, the channel is divided. The principal branch runs north-westerly, and enters the Huron at Moose point, said to be about thirty mils from Penetanguishine. The lower branch appearing to lead off about one third of the water, continues in a westerly course thirteen or fourteen miles to a small sequestered bay on the lake, about ten miles north of the same place.

We followed the lower stream. There are on it ten short portages chiefly passing moderate falls, which, with some rapid water, form a descent from the Muskoka lake, of probably about one hundred and fifty feet. The breadth of this channel is very irregular, particularly towards its outlet, where it spreads out into ponds full of rocky islands. The lands along it continue good, and even appear to increase in fertility as we approach the lake. The soil at the portages is richer than I had generally observed close to the river, and often free from stones to the brink of the falls and rapids. Within three or four miles of lake

Huron, a sudden change takes place, and nothing is now seen but low, solid, and frequently bare masses of rock. We reached the immense expanse of water the seventeenth of September, the eighteenth day from the Ottawa, and a long swell from the boundless north-west drove our *now* little canoe speedily into the bay of Penetanguishine.

No contrast can be more complete than that of the fine sloping hard-wood lands surrounding this spacious inlet, and the bleak granite coasts and islands immediately to the northward. Proceeding down the bay, we soon perceived that the settlement of its shores was in the act of commencement. At various points were small new inroads into the forest, with buildings apparently but of a few days standing. On approaching one of these, a voice in the broad Yorkshire dialect, directed us round a point into the smaller cove on which is the naval station.

One cannot view this noble bay and its vicinity, forming a position at once beautiful, fertile, and central, between the older settlements of Upper Canada, and the great western navigation of the lakes, without feeling a surprise that it should have remained in a state of nature to so late a day. As a port, however, Penetanguishine seems to have one serious disadvantage. From its retired situation at the bottom of the Georgian bay, and the prevalence of strong north-west winds at particular seasons, it is often a matter of the greatest difficulty for vessels to gain from hence the body of the lake. The master of a schooner which happened to be at the station, informed me that in the previous autumn he had spent twenty-five days in attempting to beat round Cabot's head, and, if I remember right, was obliged after all to winter his vessel in the bay.

In returning, I fell in with the man who had remained

at the Cedar lake on the twenty-fifth day after leaving him. He had procured a chart of the lower part of the Nesswabic, and was prepared to start punctually on the thirtieth day. It was well for him that we had not been delayed beyond that time, as his safe descent, alone and inexperienced in such a channel, would have been almost impossible.

It occupied us altogether twelve days to repass from Penetanguishine to the lake des Allumettes. Our travelling was not expeditious, the men being obliged to pass twice over the portages, and it being often very difficult to get our three fathomed canoe through the uncleared tracks.—Had I kept my old route instead of ascending the Severn, and afterwards turning south by the Madaweska waters, we should probably have regained the Ottawa in ten days. By the sources of the Nesswabic, a good route for canoes (considering the elevation of the country) might be easily opened the whole way from lake Huron to the Cedar lake. Little rapid water is encountered on this route, and none of the portages, in all about forty-five, exceed three quarters of a mile. If these were widened where necessary and some fallen trees and drift wood removed from the upper parts of the rivers, a well manned canoe might pass between the two points in four or five days. From the Cedar lake to the Ottawa, the various routes are difficult or circuitous, as before explained, and the only apparent way to obtain expeditious access here, is by a road up the Maskinongé valley.

From every appearance of the country along the upper parts of the Nesswabic, and the whole of the Muskoka river, I have no doubt that a fair proportion of it is fit for settlement and cultivation. On this line, the lands throughout appear to be composed of the lighter soils, and

are well elevated above the waters. My opportunities of examining them were chiefly confined to the neighborhood of the falls and rapids, where, of course, we may expect to find the inferior portion of the soil; but even in these places I frequently found excellent loamy lands, and seldom any that are totally unfit for cultivation. If, however, this line of country cannot be considered as the richest in Canada; its considerable elevation, free soil, and pure waters, ensure it as being unsurpassed, and perhaps unequalled, by any other section of the country, in the important requisite of healthiness.

With regard to the nature of the whole body of the country, extending from the sources of the Madawaska to lake Nipissing, and from lake Huron to the Ottawa, I cannot, from merely passing through it in one or two lines, pretend to speak with certainty. The central part, however, of this wide region is, without doubt, generally good, there being, as already stated, every reason to suppose that the soil increases in fertility as we descend from the elevated tracts on the head waters of the Nesswabic and Muskoka, towards lake Nipissing. As to that part nearer lake Huron, and south of the French river, I have obtained but little distinct account, which is favorable, however, as far as it goes. On the whole, every thing I have seen or heard, enables me at least to state that in this, hitherto, unnoticed part of Canada, a fine habitable country will be found, to the extent of millions of acres; and I have now only to express my hope, that it will, ere long, be rendered accessible to population.

Notes respecting certain TEXTILE SUBSTANCES *in use among the North American* INDIANS, *by* W. GREEN, *Esqr.*

THE Indians of North America were found, by the Europeans, in possession of the means of manufacturing cordage, and of making a variety of articles of fine thread, both by ingenious plaiting, and by weaving in its simpler modes. It does not appear that, for these purposes, they used the flaxen and hempen fibres which we employ; nor does it appear that the *phormion tenax*, (if, indeed, this continent or its islands produced that plant, so abundant in New Zealand, and elsewhere in Polynesia,) nor that the nettle, [*urtica*] each of them so much superior in strength and elasticity to hemp, were known to the Indians as textile fibre. Sinew and hide were among the substances extensively used by them, and preferred for many purposes for which their superior strength and the minute divisibility of the former peculiarly fitted them. The flax and hemp introduced from Europe, have by no means, even now, and among those Indians whose domestication has given them the readiest access to European productions, superseded the use of the substances employed by their ancestors: and, if this retention be not merely a consequence of partiality for that which is derived from the remote past—

but be founded on a knowledge, either of the sufficient or the superior fitness of the articles to the end of their application, or on the facility with which, from their abundance, they may every where be procured, it may be useful to record what are the substances, and what the process by which they are prepared, in the hope of enlarging our own list of materials useful in manufactures and arts.

The inner bark of the more slender branches of the elm, of hornbeam [*carpinus*], of American walnut [*juglans cinerea*], of linden [*tilia*], of *bois de plomb* [?], being stripped from the wood, and the outer bark scraped off, is macerated in ley of wood-ashes, and boiled in it, then rinced in pure water; and, for many purposes, such as the making of various ligatures, no other preparation than merely twisting it to increase its flexibility, (as is done with withs in the same intention,) is used. But for plaiting and weaving, the bark having been treated as above, is beaten with a mallet, until its separated fibres become of the required tenuity. Among the articles made of these filaments, are the bands which, passing round the head and shoulders, sustain the weights the Indians have to carry in their excursions. The strain these bands bear on such occasions is very great. They are ingeniously plaited, often highly ornamented with embroidery, are two or three inches in breadth, are divided at the ends into narrow strips, for the more convenient attachment of the suspended baggage, and they are as soft and pliant as any thing made of flax can be.

For coarser purposes the bark of white cedar [*thuya occidentalis*], is used. It does not undergo the preparation stated above, but is merely supplied by twisting. All the above materials may be procured several feet in length.

For stitching the sheets of birch bark, of which their canoes are made, slender roots of the spruce tree are used. The root is merely slit longitudinally into strips, as thick as packthread, moistened, twisted and applied. The sewing is then payed over with resin extracted from pine-knots by boiling them in water.

The *phormion tenax*, although so exceedingly strong, contains some principle soluble in weak alkaline ley and even in soap and water, the removal of which principle reduces its strength below that of most other fibres, very much limiting its utility. The fibre procured by the Indians, in not being weakened by these menstrua, has some advantage over that otherwise invaluable filament.

It cannot be doubted that every textile fibre of vegetable origin would be a fit material for *paper*—and it is probable that the toughness of that article, which ought to be extreme, might be made as nearly equal to that of the original material as is consistent with its nature, by reducing it to pulp by *sufficiently pounding it, instead of hashing it*, (as is usually done,) into particles having little more coherence than is afterwards supplied by sizing the sheet.

Autograph Letter of COTTON MATHER, *on* WITCHCRAFT, *presented to the Literary and Historical Society, by the Honorable Chief Justice* SEWELL.

17th 6m, 1692.

Sr,

You would know whether I still retain my opinion about ye horrible Witchcrafts among us, and I acknowledge that I do.

I do still Think That when there is no further Evidence against a person but only This, That a Spectre in their Shape does afflict a neighbour, that Evidence is not enough to convict ye —— of Witchcraft.

That the Divels have a natural power wch makes them capable of exhibiting what shape they please I suppose no body doubts, and I have no absolute promise of God that they shall not exhibit *mine*.

It is the opinion generally of all protestant writers that ye Divel may thus abuse ye innocent, yea, tis ye confession of some popish ones. And or Honorable Judges are so eminent for their Justice, Wisdom, & Goodness that whatever their own particular sense may bee, yett they will not proceed capitally against any, upon a principle contested

with great odds on y^e^ other side in y^e^ Learned and Godly world.

Nevertheless, a very great use is to bee made of y^e^ spectral impressions upon y^e^ sufferers. They Justly Introduce, and Determine, an Enquiry into y^e^ circumstances of y^e^ person accused; and they strengthen other presumptions.

When so much use is made of those Things, I believe y^e^ use for w^ch^ y^e^ Great God intends y^m^ is made. And accordingly you see that y^e^ Eccellent Judges have had such an Encouraging presence of God with them, as that scarce any, if at all any, have been Tried before them, against whom God has not strangely sent in other, & more Humane & most convincing Testimonies.

If any persons have been condemned, about whom any of y^e^ Judges, are not easy in their minds, that y^e^ Evidence against them, has been satisfactory, it would certainly bee for y^e^ glory of the whole Transaction to give that person a Reprieve.

It would make all matters easier if at least Bail were taken for people Accused only by y^e^ invisible tormentors of y^e^ poor sufferers and not Blemished by any further Grounds of suspicion against them.

The odd Effects produced upon the sufferers by y^e^ look or touch of the accused are things wherein y^e^ Divels may as much Impose upon some Harmless people as by the Representacôn of their shapes.

My notion of these matters is this. A Suspected and unlawfull com^union with a Familiar Spirit, is the Thing enquired after. The communion on the *Divels* part may bee proved, while, for ought I can say, The *man* may bee Innocent; the Divel may impudently Impose his com^union upon some that care not for his company. But if the

com^union on y^e man's part bee proved, then the Business is done.

I am suspicious Lest y^e Divel may at some time or other, serve us a trick by his constancy for a long while in one way of Dealing. Wee may find the Divel using one constant course in Nineteen several Actions, and yett hee bee too hard for us at last, if wee thence make a Rule to form an Infallible Judgement of a Twentieth. It is o^r singular Happiness That wee are blessed with Judges who are Aware of this Danger.

For my own part if the Holy God should permitt such a Terrible calamity to befal myself as that a Spectre in my Shape should so molest my neighbourhood, as that they can have no quiet, altho' there should be no other Evidence against me, I should very patiently submit unto a Judgment of *Transportation*, and all reasonable men would count o^r Judges to Act, as they are like y^e Fathers of y^e public, in such a Judgment. What if such a Thing should be ordered for those whose Guilt is more Dubious, and uncertain, whose presence y^e perpetuates y^e miseries of o^r sufferers? They would cleanse y^e Land of Witchcrafts, and yett also prevent y^e shedding of Innocent Blood, whereof some are so apprehensive of Hazard. If o^r Judges want any Good Bottom, to act thus upon, You know, that besides y^e usual power of Govern^ne, to Relax many Judgments of Death, o^r General Court can soon provide a law.

S^r,

You see y^e Incoherency of my Thoughts but I hope, you will also some Reasonableness in those Thoughts.

In the year 1645, a Vast Number of persons in y^e county of *Suffolk* were apprehended, as Guilty of Witchcraft; whereof, some confessed. The parlament granted a special

com^ission of *Oyer & Terminer* for y^e^ Trial of those Witches; in w^ch^ com^ission, there were a famous Divine or two, M^r^ *Fariclough* particularly inserted. That Eccellent man did preach two sermons to y^e^ Court, before his first sitting on y^e^ Bench: Wherein having first proved the Existence of Witches, hee afterwards showed y^e^ Evil of Endeavouring y^e^ Conviction of any upon Defective Evidence. The Sermon had the Effect that none were Condemned, who could bee saved w^thout^ an Express Breach of y^e^ Law; & then tho' t'was possible some Guilty did Escape, yett the troubles of those places, were, I think Extinguished.

O^r^ case is Extraordinary. And so, you and others will pardon y^e^ Extraordinary Liberty I take to address You on this occasion. But after all, I Entreat you, that whatever you do, you Strengthen y^e^ Hands of o^r^ Honourable Judges in y^e^ Great work before y^m^. They are persons, for whom no man living has a greater veneration, than

S^r^,

Your Servant

C. MATHER.

For

the Honourable

John Foster Esq.

PLAN RAISONNE' d'EDUCATION GENERALE *et* PERMANENTE, *le plus propre à faire la prospérité du Bas-Canada, en égard à ses circonstances actuelles, par* JOSEPH FRS. PERRAULT, *ci-devant Président de deux Sociétés d'Education et fondateur d'une Ecole Elémentaire Française à Québec.*

AYANT vu dans le Star du 15 de Septembre 1830, l'annonce de la Société Littéraire et Historique de Québec, et la promesse " d'une Médaille honoraire d'argent pour le " plan raisonné d'éducation générale et permanente, le plus " propre à faire la prospérité du Bas-Canada, eu égard à " ses circonstances actuelles," je me suis cru appelé, nommément, à entrer en lice sur cet important objet, qui m'occupe depuis plus de vingt ans, et sur lequel j'ai déjà émis mon opinion.

On peut comparer l'éducation dans ce pays, à une terre qui est à ouvrir et exploiter.

Pour le faire, avec succès, on doit y procéder avec circonspection ; de même qu'un bon Cultivateur fait le tour de sa terre, en examine le sol dans toute son étendue, pour connoitre les endroits propres aux semences qu'il se propose d'y répandre, à la saison la plus propice pour le faire ; de même on doit s'enquérir des sites les plus convenables pour

ériger des Ecoles, des Séminaires, des Collèges, des Universités, &c. convenir de l'instruction que l'on donnera dans chacun de ces établissements ; le mode d'enseignement que l'on adoptera ; la qualification des maitres et précepteurs que l'on exigera ; les recettes et dépenses de ces divers établissements ; et enfin la surveillance du tout, eu égard aux circonstances où se trouve actuellement la Province du Bas-Canada, à cause des différentes professions de foi de ses habitants.

J'exposerai succinctement ces requisitions, que j'estime essentielles, dans des chapitres distincts et séparés ; afin d'établir l'éducation, dans le pays, sur des bases solides, substancielles et permanentes, comme on le demande.

CHAPITRE I.

Des Sites des Etablissements d'Education.

Il est évident que des Ecoles, des Séminaires, des Collèges, des Universités ne peuvent être érigés en même quantité et même dimension, être placés, de proche en proche, les uns comme les autres ; le bon sens veut que le tout soit proportionné aux besoins ; en conséquence que des écoles élémentaires soient érigées, dans les Paroisses ; les Séminaires et les Collèges dans les Comtés, et les Universités dans les chef-lieux des Districts.

La meilleure échelle de proportion pour l'érection d'un tel établissement est, sans doute, la population.

En conséquence il devroit être réglé, qu'il ne sera érigé une école publique d'éducation élémentaire que dans l'endroit le plus central, où se trouveroient au moins quatre cents pères de famille.

Que les Séminaires et Collèges publics ne seraient établis que dans les comtés dont la population donneroit trois mille pères de famille.

Que l'on ne bâtirait d'Universités que dans les villes et cités des districts, contenant au moins six mille pères de famille.

Les écoles élémentaires devraient être érigées sur un terrein, d'aumoins deux arpents de terre en superficie, afin d'y faire cultiver un jardin potager, par les écoliers, et les initier par ce moyen dans la connoissance de ce que l'on appele la petite culture ; tout en apprenant à lire, écrire et compter.

La maison devroit être au moins de trente pieds sur toutes faces, avoir douze à quinze pieds d'élévation entre les deux planchers, avec une porte à deux battants sur le devant, et une allée de sept a huit pieds de large conduisant à l'estrade du maitre dans le fond, avec aussi deux fenêtres sur le devant et autant derrière, de sept pieds de haut et à quatre pieds au dessus du plancher de bas ; une cheminée dans un des pignons pour recevoir le tuyau d'un poële ; si cette maison est distribuée, comme celle que j'ai bâtie au Fauxbourg St. Louis, elle contiendra deux cents enfans.

Les Séminaires et Collèges dans les Comtés devroient être des édifices à deux étages de cent pieds de long, sur quarante de profondeur et être bâtis sur une terre de quatre vingt à cent arpents ; pour, outre les connoissances que l'on donne ordinairement dans ces maisons, y faire un cours théorique et pratique de la grande culture.

Les Universités doivent être bâties, sur quatre faces, comme le Collège des ci-devant Jésuites à Québec ; être vastes, pour y avoir des appartements séparés, dans chacun desquels on enseigneroit les hautes Sciences ; on feroit les expériences, on placeroit les instruments ; on feroit les observations astronomiques, &c. &c. &c.

CHAPITRE II.

De l'Instruction que l'on doit donner dans les Etablissements publics d'Education.

Comme il ne peut y avoir de bonne éducation que celle qui est fondée sur la morale chrétienne, on doit l'enseigner dans tous les établissements d'éducation publique dans le pays ; régler ensuite que, dans les écoles élementaires de paroisses, on y montrera, outre les prières et le catéchisme, à lire, écrire et compter, et de plus, à jardiner ; en conséquence que le jardinage se feroit à la fraicheur du matin, depuis huit heures jusqu'à dix, et du soir depuis trois jusqu'à cinq.

Que l'on distribuera les heures d'étude et de travail dans les Séminaires et Collèges des Comtés, de la même manière, autant que faire se pourra, dans le cours de l'année ; excepté dans les temps de semence et de récolte où le travail du dehors sera prolongé.

Que ces établissements doivent être fournis des instruments aratoires analogues aux travaux qui doivent s'y faire, ou des matériaux nécessaires pour les faire faire par les élèves ; ils doivent être aussi pourvus d'animaux propres à l'exploitation des terres, qui y seront logés, nourris et soignés par les écoliers, afin de les instruire dans l'économie rurale et l'art vétérinaire.

Les Universités doivent être pourvues d'habiles professeurs, dans les différentes branches d'instructions que l'on a coutume de donner dans ces sortes d'établissements, des ingrédients et instruments nécessaires pour les expériences et observations astronomiques ; dont l'époque de ces divers cours sera fixée par les Directeurs, ou Superintendans de ces maisons.

CHAPITRE III.

Du mode d'enseignement à adopter.

L'enseignement mutuel, c'est-à-dire : le sistême Lancasterien, étant universellement reconnu être le meilleur, sera celui que vraisemblablement on adoptera ; mais comme il y a été fait plusieurs améliorations, il est à désirer que la Société Littéraire depêche quelques uns de ses membres pour visiter les écoles tenues à Québec d'après ce mode, et dans quelques unes des quelles il a été fait de grandes améliorations, tant dans la quantité d'exercices que l'on y fait pour instruire, que dans la diminution des dépenses pour y parvenir.

Afin de mettre la Société en état de juger des améliorations faites à ce mode d'enseignement, il lui soumet son manuel pratique et l'invite à se transporter à son Ecole Elémentaire Françoise située au Fauxbourg St. Louis, pendant sa tenue.

CHAPITRE IV.

Des qualifications des Maitres et Précepteurs.

Si l'on veut introduire l'uniformité dans l'éducation à donner à la Jeunesse du pays, il faut non seulement adopter un mode d'enseignement, mais encore former des Précepteurs et des Maitres qui puissent le propager ; pour ce faire il faut les obliger à suivre un cours dans les meilleurs écoles des cités, érigées dans les districts de la Province ; ne les point admettre à tenir des écoles publiques, a moins qu'ils ne soient munis de certificats de capacités, de ceux qui sont à la tête de ces écoles.

On ne peut se promettre de l'uniformité dans l'enseignement, ni la certitude d'une bonne éducation que par ce moyen ; pour quoi je prends la liberté de le recommander comme une mesure essentielle.

CHAPITRE V.

Des recettes et dépenses des Etablissements d'Education.

Il sera bon de faire supporter la dépense des établissements d'éducation par les habitants qui les demandent, ainsi que par ceux chez qui il sera jugé à propos d'en ériger ; et ce de la même manière qu'ils coopèrent, ou sont forcés de coopérer, pour la bâtisse et réparation de leurs Eglises et Presbytères.

Alors on les verra y prendre intérêt et se glorifier d'avoir les plus beaux édifices, les meilleurs maitres, la plus grande quantité d'enfants dans ces écoles, &c. &c. &c. comme ils font pour leurs Eglises et Presbytères.

Comme les pères de famille sont aussi bien tenus de donner de l'éducation à leurs enfants, que de leur procurer la nourriture et l'entretien, ils doivent non seulement contribuer à l'érection et entretien des bâtiments, mais encore au salaire des Maitres et Précepteurs.

Par ce moyen la Province se trouveroit déchargée d'un fardeau qui tôt ou tard lui sera très-onéreux ; se réservant toutefois le droit d'accorder des suppléments et de donner des gratifications aux Maitres, Précepteurs et Professeurs, dans des cas privés ; afin d'encourager l'émulation.

CHAPITRE VI.

De la surveillance du tout.

Comme il y a tout lieu de présumer qu'il y aura, un jour à venir, un grand nombre de ces établissements, dans une Province aussi étendue qu'est le Bas-Canada, il est essentiel de les organiser de manière qu'on en puisse suivre le fil et les surveiller.

La division de la Province en Paroisses, Districts et Comtés nous doit naturellement fournir ce moyen d'organisation ;

on devroit donc dans la principale cité de chaque District former un Bureau central qui auroit la direction et surveillance des établissements d'education faits et à faire dans les Paroisses et Comtés et leurs arondissements.

Chacun de ces Bureaux devroit être confié, soit à une seule personne (ce que je préférerois) soit a plusieurs.

On devroit s'adresser à ces personnes pour tout ce qui concerneroit l'érection, l'entretien et la police des établissements d'éducation ; la nomination et fixation des salaires des Maitres et Précepteurs ; la surveillance et repression des abus ; la promulgation des règles et réglements.

C'est aussi à ces personnes que devroient être faits les retours du nombre de ces établissements, dans les Paroisses, Comtés et Villes des Districts, de la quantité d'élèves qu'ils contiennent, de leurs dépenses et recettes.

Chacun de ces Bureaux devroit être tenu de faire le tableau général de son District d'après ces divers retours, le remettre à qui lui seroit ordonné, ou le faire imprimer dans une Gazette, pour l'information publique.

Etant spécialement donné en charge par la Société d'avoir égard aux circonstances actuelles du Canada ; et les circonstances où il se trouve, par rapport aux trois professions de foi qui y sont reconnus, demandant des dispositions, qui préviennent les animosités, et donnent à chacune d'elles des suretés qu'elles ne seront point troublées dans les exercices et propagation de leurs croyances respectives, il devroit être formé, outre les Bureaux centrals de Districts, des Bureaux particuliers de membres de chacune de ces professions de foi, qui auroient la direction et superintendance des établissements de ceux de leur croyance seulement, et séparément de ceux d'une autre croyance ; en avoir seuls l'érection, l'entretien et la police ; la nomination et

fixation des salaires des Maitres et Précepteurs ; la réformation des abus ; et la promulgation des règles et réglements : dont et du tout ils devront faire rapport au Bureau central de leurs Districts respectifs.

Les Bureaux centrals devroient être autorisés à former des Bureaux particuliers dans les Comtés de leurs Districts respectifs, quand le cas le requérera, ou qu'ils en seront sollicités ; à en nommer les membres, à leur donner des règles et à en recevoir les retours des écoles et autres établissements publics et privés de leurs Comtés respectifs.

Comme il y a des sectes de l'Eglise Anglicanne et Presbytérienne qui désireroient avoir des établissements d'éducations particuliers, pour élever leurs enfants dans leur croyance, ils devront s'adresser au Bureau particulier de l'Eglise Anglicanne ou Presbytérienne, dans lequel ils ont plus de confiance, pour être autorisés à les ériger, les entretenir et les surveiller eux mêmes ; à en nommer les Maitres et Précepteurs, à leur fixer leur salaire et à leur donner les régles et réglements qu'ils jugeront convenables pour l'enseignement et la police de ces sortes d'établissements.

Il seroit très a propos d'empécher qui que ce soit d'ouvrir des établissements publics, ou privés, d'éducation et enseignement quelconque, a moins que la personne qui se propose de le faire n'obtienne d'un Bureau central, ou particulier, du District où elle veut s'établir, un certificat de bonnes mœurs et de capacité ainsi que la permission de le faire.

Je ne puis terminer l'apperçu de ce que je conçois être le plus propre à propager l'éducation dans le Bas-Canada, eu égard à ses circonstances actuelles, sans suggérer à la Société Littéraire et Historique de Québec, le besoin d'exciter l'émulation des écrivains sur le mode d'enseignement le plus expéditif et le moins dispendieux pour le pays ;

ainsi que sur la méthode théorique et pratique de la grande et petite culture convenable au Bas-Canada.

Quoi que chacun des chapitres que j'indique soit susceptible d'une plus grande extension, je n'ai pas cru devoir le faire ; j'ai préféré la laisser à la pénétration et sagacité des Membres de la Société et me restraindre à ne donner qu'un apperçu des bases, sur lesquelles, on devroit, à mon avis, appuyer l'enseignement de l'éducation, dans le pays ; pour le rendre solide, substanciel et permanent.

Remarks on the STOVES *used in* RUSSIA *for warming dwelling houses, with a Plan and Model, by the Honorable Chief Justice* SEWELL.

IN every climate which in severity is equal to that of Canada, whatever tends to promote œconomy in the article of fuel, and to enable the inhabitant to keep his habitation warm and comfortable at a diminished expenditure of wood or coal, deserves attention. The Russians and the people in the north of Germany are liable to the effects of as great a degree of cold as we are in Lower Canada, and they have, for a series of years, endeavoured to obtain the greatest quantity of heat from the smallest possible expenditure of fuel, and have ultimately adopted and maintain in general use, stoves of a peculiar construction, which appear from the accounts which are given of their effects to answer the purposes for which they were intended. Of these stoves I have the honor to submit to the consideration of the society, a model and two drawings with sections horizontal and vertical.

The model represents such a stove as is used in an ordinary peasant-house in Russia, and is said to be in general use in the hospitals of that country. This stove consists of a small iron oven, surrounded on three sides

with a wall of brick or tile, arched. Between the walls and the exterior of the oven, there is a space, into which the common air of the room is admitted through apertures which are placed in the brick wall on the level of the hearth; it there mixes with the heat which it imbibes from the oven, and becoming sufficiently rarified ascends through the pipes, which are placed in the arched covering of brick, to the top of the room, from whence it is diffused through the whole apartment or carried into other apartments, at the option of the owner. The smoke descends from the interior of the oven into a flue which surrounds it, and passing through that flue ascends and escapes by a chimney.

This description will be better understood by references to the model, in which

(A) is a foundation of brick or stone, on which the stove stands.

(B) the grate on which the fire is made.

(C) a wall of brick surrounding the grate.

(F) the oven, which is of wrought or cast iron.

(D) the passage to the smoke flue or chimney.

(O) the external wall of brick which surrounds the oven with apertures at the floor to admit the air.

(G) the arch turned over the oven.

(P. P) the pipes through which the heated air ascends into the room.

(H) the door of the oven.

(I) the chimney, or smoke flue by which the smoke escapes, in which there is a regulator, which is nearly closed when there is no smoke.

There is annexed to this model, a scale of English feet

by which the exact size of any particular part of this stove can be immediately and correctly determined.

The drawings represent two Russian stoves of a different description, intended for entrance halls, parlours, dining rooms, &c. The first of these drawings delineates such a stove as is usually placed against the wall, in the centre, between the two extremities of the room. The other, such as is usually placed in the corners of two contiguous apartments and is intended to warm both.

These stoves are not calculated to heat a current of air, passing through the stove, and to disperse it through the apartment by rarefraction; on the contrary, they are designed to warm the circumambient air within the room, by heat imbibed by the air from the exterior of the stove, and for this purpose they are lofty, and the flame, heat, and smoke, are made to circulate through several flues which are formed within the stove, before they are suffered to escape by the chimney, in which there is a regulator, to be nearly closed when there is no smoke, as in the common stove.

The figure (D) in the drawing exhibits the exterior of the first of these stoves with the stove-door *(m)* and two smaller doors, *(a)-(a)* which afford access to the dampers. The dotted line *c d* is the line of the horizontal section of this stove delineated in the figure (A) and the dotted line *f g* is the line of the horizontal section, delineated in the figure (B).—The figure (C) is a vertical section of this stove, and the dotted lines *a b*—on the figures A & B—show the line of this vertical section which cuts the front flues in the centre.

In all these figures the brick work is represented in red, the external ornamental covering in yellow; and the walls of the apartments and of the chimnies in black.

The construction of both these stoves is alike.—Both rest upon a brick foundation, on which a hearth stone is placed, on these the fire place, the flues, and the exterior walls are raised, and to the latter the ornamental covering is united by iron clasps.—Three rows of tiles lying one over another, and two rows of bricks, form the ceiling of this stove and a double superstructure of the ornamental covering terminates the whole.—This is shown in the figure (C)—The space *p g e u* (figure A) is the fire chamber arched to *t r* (as shown in the figure C)—From the open arch at *t r* (figure A) the flame, heat, and smoke rise into the flue *(o)* and ascend through it to the ceiling of the stove, and there enter through an aperture of the same diameter as the flue *(o)* into the flue No. 1, descend again to the level of the hearth, and there pass through a similar aperture into the flue No. 2—then fall into No. 3—rise again into No. 4—fall into No. 5—rise again into No. 6—fall into No. 7, and descend till they reach the arch of the fire place from whence they ascend through No. 8, into the chimney.—The passage of the flame, heat, and smoke through the flues Nos. 6, 7 and 8, is particularly delineated in the figure C and the lines *i k s q* in this figure exhibit the aperture by which they pass from No. 5 into No. 6.

As soon as the wood in the stove is reduced to charcoal and there is no more smoke—the heat is retained by nearly closing the damper in the flue No. 8. which is shown in figure C. This damper is removed through the door *(a)* (figure D) before the fire is lighted. The damper is sometimes placed in No. 6, at the spot where the other small door (*a*) appears in the figure D.

The figure (H) in the drawing exhibits the exterior of the second stove with the stove door *(m)* and the damper

door *(a)*—the dotted line *c d* is the line of the horizontal section of this stove delineated in the figure E—and the dotted line *f g*—is the line of the horizontal section delineated in the figure F. The figure G is a vertical section of this stove, and the dotted lines *a b* on the figures E & F show the line of this vertical section which cuts the front flues in the center. The letters *w p r t* in figure E, is in this stove the arched fire chamber, out of which the flame enters into the flue *(o)*—rises therein falls into No. 1, rises into No. 2, falls into No. 3, rises into No. 4, falls into No. 5, rises into No. 6, falls into No. 7, and passes from thence into the chimney at Z. It must be remarked that the figures, 9 and 10 in figure F only denote empty spaces.

Great care must be taken in heating these stoves; in Russia, birch wood is generally used for this purpose, but the damper must not be closed, until the ignited wood has become completely charcoal. If there be a piece of wood in flames when the damper is closed, suffocation may be the consequence. The exterior of these stoves is made in Russia of white glazed tiles. It is however, probable, that soap stone may be used with great advantage in the construction of these stoves throughout, but especially for the exterior, and if so, it would supply the want of tiles.

There is a scale of English feet upon the drawings of these stoves by which the dimensions of each of them, or of any part of either of them, may be readily ascertained.

The following Essay was written by Lieut. BADDELY, R. E. as a candidate for one of the prizes offered by the Society for the best treatise on the subject to which it relates, and which was unanimously awarded to that gentleman at the general annual meeting of the Society on the first Tuesday of December, 1830.

An Essay on the localities of METALLIC MINERALS *in the* CANADAS, *with some notices of their Geological associations and situation, &c. by Lieut.* BADDELY, *R. E.*

INTRODUCTORY.

Having observed among the subjects upon which the Council of the Literary and Historical Society of Quebec, is desirous to obtain information, one which my previous studies and inquiries have rendered me somewhat familiar with, I presume, emulous of the Society's honorary award, to rank myself in the list of competitors for so desirable a mark of its notice.

The subject to which I allude is thus described: "On the deposits of ores along the coasts of the St. Lawrence, within the limits of the Lower Province."

In obeying the call of the Society, I trust it will not be deemed a liberty if, in conveying to it the information I

possess on this subject, the prescribed limits be broken down and the field of research carried into both Provinces. To do so, it is proposed to make use of all the information which can be obtained, either from the reports of credible eye witnesses, or from that which is to be found already in the hands of the public.* This, joined to what little original matter I may have myself to communicate, will, it is hoped, as a compilation merit the approbation, as I know it will receive the indulgence of that Society, whose efforts to collect and reduce the ore of intelligence which exists in the country, claim not only the encouraging notice of its inhabitants, but that of the whole civilized world.

GENERAL OBSERVATIONS.

I propose to commence this Essay with some general observations upon those ores which are either known to occur in this country or which have been reported to do so. Among the former iron ores rank first as much on account of the profusion in which they are distributed over many portions of the two Provinces as because of their superior usefulness to all other ores.

ORES OF IRON.

Seven species of iron ore have been noticed in Canada, viz. the magnetic oxide, specular iron ore, the red oxide, the brown oxide, the argillaceous oxide, the carbonate of iron, (sparry iron ore,) and the sulphuret of iron, (iron pyrites). To these, for the sake of analogy, I am disposed to add an eighth—the carburet of iron, which, indeed,

* Some years ago I presented a paper to the members of the Literary and Historical Society, entitled "Localities of Canadian Minerals," which they did me the honor to have published; from this, either in form or substance, my principal extracts will be taken.

although containing very little iron and placed by most mineralogical writers under the class "combustible minerals," is by some introduced among the iron ores.

MAGNETIC OXIDE OF IRON.

As yeilding the best iron and in greatest quantity, merits the first attention.

The magnetic oxide of iron has been found abundantly in Canada, but only in one place where it has been smelted; at least I have no certain knowledge of more than one, although it is reported that a portion of the ore formerly employed to supply the furnace, at that period in operation, in the seigniory of Batiscan, L. C. was of this species of ore.

The quantity of this description of ore in the township of Marmora and Belmont, U. C. is probably inexhaustible.—Its quality is generally good, in many instances excellent, and a large portion of it can be brought by water to the smelting works situated on the Crow River, at a comparatively trifling expence.—(Note 1.)

About four leagues in rear of St. Paul's Bay, L. C. there is another considerable deposit of the black oxide of iron or magnetic oxide. It was known and partly explored, according to Charlevoix, when the French were in possession of the country, but I believe no smelting furnace was ever established in the neighbourhood.—(Note 2.)

In the townships of Houghborough and Camden, U. C. it is said to occur in great abundance; as also at Hull on the Ottawa.—(Note 3.)

As an alluvial sand it is often found forming ripples and ridges at parallel levels, and distances on the shores of rivers, particularly on the shores of those rivers in the districts of Quebec and Three Rivers, which have their

estuaries on the northern shore of the St. Lawrence.—(Note 4.)

Magnetic oxide of iron *in situ* is characteristic of primary formations and is, when met with, generally perceived to form beds in granite or gneiss, or mica slate, or chlorite slate, or serpentine, or greenstone, (primary,) or sienite. It is with the two last that is has been observed to be associated in this country. Rocks abounding in hornblende, and such are many of those in Canada, often contain it.—According to some authors it has been observed in transition and even secondary rocks, but such an occurrence, I believe to be very rare, if it be even well established as a fact. The Swedish bar so much esteemed every where is manufactured from this species of ore.

SPECULAR OXIDE OF IRON.

From the mines close to the establishment at Marmora is taken an ore, which I consider as belonging to this species. It is believed to be the only place in this country where it has been found in any abundance. It occurs associated with red and yellow ochre, sparry iron, and argillaceous oxide of iron, near the junction of the primary and transition rocks, forming discontinuous veins or beds in the former, a sienite. No information can be given as to the quantity which remains, as the spot which has been opened in exploring it and the other ores with which it is associated, is now, apparently, exhausted; but there is great probability that more would be found if sought for.—It is with difficulty extracted. The splendent lustre and pavonine tarnish so frequently present in this species of ore, and from which circumstance it has been named, is absent from the ore in question, but all its other characters agree.

The geological position of specular iron ore is generally among the primary formations, but sometimes also with transition. The largest known deposit of this ore is in the Island of Elba, where it forms mountain masses. It has been long known and admired for its splendent lustre and for its beautiful pavonine tarnish. It is considered, when abundant a profitable and valuable ore. "It furnishes good iron both cast and malleable, but the latter is said to be harder than that obtained from magnetic iron. It generally yields from 65 to 75 per cent."—CLEAVELAND.

RED OXIDE OF IRON.

This ore has been noticed in two or three places in Canada, but most abundantly in the neighbourhood of Henderson's Lake, on the Gannanoqui, where it forms apparently an extensive bed in a ferruginous sandstone (old red sandstone).—(Note 5.)

At the Furnace Falls about three miles below this deposit there was formerly a smelting establishment, where some few articles were manufactured, not however from the ore above alluded to, as that was discovered long after these works were deserted, and none of it appears to have been smelted for any other purpose than experiment, which is said to have been favorable.

The red oxide of iron (red ochre) found at Marmora associated with sparry ore &c. is like the latter used as a flux for the more obstinate ores.

On the Magdalen Islands, in the Gulf of St. Lawrence, a very fine description of red ochre is obtained well adapted for a pigment.—(See 1st vol. of the Transactions, p. 44.)

The position of the Furnace Falls is one highly favorable for the establishment of a smelting furnace, and if there be

an abundance of ore of a good quality in the neighbourhood, which I cannot, however, take upon myself to say there is, it well deserves the notice of government, or that of some monied company or individual. I have been informed that with very little expense, the river might be rendered navigable from the head of these falls to the Rideau.

BROWN OXIDE OF IRON.

I have not seen any other variety of this species than the ochrey or yellow ochre and umber. The first is, like the red ochre, found always associated with other ores of iron, from which, like rust from malleable iron, they seem to have had their origin. As a stain upon rocks the two oxides are often seen here as elsewhere. There appears, however, to be an independent bed of it at St. Augustin, Lake Calvaire, L. C. and in the parish of l'Ancienne Lorette.—(see 1st vol. Transactions, p. 44.)

Captain Bayfield noticed "brown iron ore crystallized and otherwise," on the islets of Gargantua, Lake Superior.

Umber, which is a variety of this species, is so named from the circumstance of its having been first noticed in the dutchy of Spoletto, anciently called Umbria. It has been found at Beauport, near Quebec, on land belonging to Sheriff Sewell.

Umber has been sometimes classed with earthy minerals, very erroneously, I think, as it contains 48 per cent. of iron, and 20 per cent. of manganese. Its use as a pigment is well known, and for that purpose it is brought principally from the Isle of Cyprus, where it occurs in beds.

ARGILLACEOUS OXIDE OF IRON.

The argillaceous oxide of iron, which is next in abundance in this country to the magnetic oxide, and from

which it is probably derived in a great measure, is found abundantly in many places in the two provinces, particularly in rear of the two seigniories of Batiscan and Champlain, L. C. where, and in the neighbourhood of which seigniories it is procured in considerable quantity:—It is the only extensive deposit of this species of ore, which has yet been worked in Lower Canada, and the furnace at the forges of St. Maurice is entirely supplied by it. It belongs to that variety of the argillaceous oxide called bog ore.—(Note 6.)

Bog ore is characteristic of an alluvial formation, indeed it is one itself, as no doubt exists of its being a deposit from water holding iron in solution. The supposition that it grows is a very vulgar error.

"The iron obtained from bog iron ore, is what is termed cold short, and therefore can rarely be used for plate iron, —never for wire."—PHILLIPS.

CARBONATE OF IRON.—SPARRY IRON ORE.

The carbonate of iron is found in the immediate neighbourhood of the works at Marmora, where it is associated, as has been said, with the red and brown oxides of iron, and specular iron ore. A vein of it has been worked chiefly as a flux for the furnace. The vein has been found to be continuous, but the ore is not easily extracted.

A vein of the carbonate of iron, with pearl spar, has been observed to traverse grey wacke at Dr. Mills's quarry at Cap Rouge.

"Sparry iron is a very valuable ore, more especially as it is readily converted into steel, and is hence sometimes called steel ore."—CLEAVELAND.

SULPHURET OF IRON.—IRON PYRITES.

No mineral appears to be more generally distributed over the world than sulphuret of iron, and it has, of course, been frequently met with in this country. It is seldom, however, found in any considerable quantity in one spot, when this is the case it is important, because at a trifling expense it can be converted into an article of commerce called copperas or green vitriol, which is a sulphate of iron. The process is, I believe, as follows: the iron pyrites are gathered together in heaps six or eight feet high upon platforms, these are exposed to the action of the atmosphere for about a twelve month, when they are found to have undergone a spontaneous decomposition and a sulphate of iron has been formed. This sulphate of iron being soluble in water has, a large portion of it, been received into troughs communicating with the platforms by pipes or drains. The liquid thus obtained is afterwards evaporated and sulphate of iron in a concrete state is formed. This species of decomposition is effected in the following manner, the sulphur combined with the iron to form iron pyrites attracts oxigen from the air and passes into sulphuric acid which acting upon the iron forms sulphate of iron.—Some varieties of pyrites require to be roasted before this decomposition will take place.

Iron pyrites is never smelted as an ore of iron unless it be intimately mixed with other ores so as to be inseparable, such is the case with much of the ore at Marmora. Its presence is considered injurious to ores.

Five considerable deposits of iron pyrites have been noticed, viz. on an island on the south shore of Drummond Island;* on another island off the north coast of the same

* This island has lately passed from under the British dominion.

island; on an island in the eastern part of Neepigon Bay, Lake Superior; and at Becketts Mills, Short Hills, Niagara district, and in the township of Elizabeth.

No copperas works have yet been established; but in the United States there are several, and one at Strafford in New Jersey is said to have yielded three tons of copperas in two days.

Sulphur is sometimes extracted from iron pyrites by sublimation.

Iron pyrites has been often mistaken for an ore of gold. Its superior hardness and unmalleable character will distinguish them. It is true that the former does sometimes contain gold, but never, I believe, in sufficient quantity to render its extraction profitable.

The sulphuret of iron is found in all formations from the oldest to the newest, but the magnetic variety or proto sulphuret occurs only among rocks of the primary order.

GRAPHITE.—CARBURET OF IRON.—PLUMBAGO.

This, as has been said, is more usually classed with combustible minerals, but from its chemical name and from its being found in some abundance it is here introduced as a metallic one.

According to reports there is a large supply of this mineral in the township of Houghborough, also at Hull on the Ottawa, where it is mixed up very plentifully with magnetic iron. Between these two places it occurs frequently disseminated through many rocks and minerals.—The names of plumbago and black lead, which are so frequently given to this substance, encourage an erroneons opinion to prevail that it is an ore of lead, with which it scarcely possesses one character in common. Carbon and

iron are alone its constituents, the former at the rate of from 91 to 96 per cent.

Besides its other well known uses, graphite has been lately employed to diminish the friction of wheel work, &c.

ORES OF MANGANESE.

In the state of an oxide, manganese is almost as universally distributed over the globe as iron, though mines of the former are much more rare than those of the latter.—It exists in variable proportions in the garnet, schorl, epidote, angite, &c. &c. but particularly in the brown and sparry iron ores, also in bog ore. In this country it has not been frequently noticed, and only, as I am aware, in the lower province; but I believe that it has been often overlooked, as it is not probable that it will be found to be rare in a country abounding so much in iron, its constant associate elsewhere.

EARTHY OXIDE OF MANGANESE.—WAD?

One sub species of the earthy oxide only, has been observed, that provincially named wad. It occurs, as bog ore often does, on the banks of a small stream, and is evidently a recent alluvial formation.—(Note 7.)

The oxide of manganese, is more frequently found in primary and transition rocks, than in secondary, but the earthy variety is probably forming daily.

ORES OF SILVER.

Reports have been received frequently respecting the discovery of silver ores, but I believe them all to have been erroneous. Silver, indeed, has been found in the galena from St. Paul's Bay in sufficient quantity, as it is said, to be worth extracting; but admitting this to be the

case, the quantity of the galena itself is insignificant.—(Note 8.)

All the sulphurets of lead (galenas) contain a portion of silver, and where that portion is large, and consequently worth extracting, they are called argentiferous, from such, a large proportion of the silver of commerce is extracted. A vein of argentiferous galena on Sir Phillip Hawkin's estate in Cornwall, yields 20 per cent. of silver.

That ores of silver should be found in this country, is by no means improbable; its rocks are precisely those for the most part in which they occur in other countries, such as granite, gneiss, micaceous and argillaceous slates, greenstone (primary), sienite, hornblende, slate, gray wacke, compact limestone, and secondary slates. They should not be sought for above the mountain or carboniferous limestone which, in the lower province at least, appears to be the last rock deposit that has taken place.

ORES OF COPPER.

Ores of copper have not been found in Canada in such portions as to indicate its presence in abundance. Forming insignificant veins in and coatings upon rocks, principally of the trap formation. Copper has been seen also distributed in grains, plates, and wires, through angular detached masses of porphyretic trap.—(See 1st vol. of the Transactions, pages 23 and 39.

These traces, however, together with the large detached masses of native copper, which have been noticed by Schoolcraft and others, as occurring in the neighbourhood of Lake Superior, may lead, one of these days, to the discovery and successful exploration of copper mines in that section of the country.

It is almost exclusively the native copper which has been observed in this country. The sulphuret and carbonate have been noticed, but it only appears in mere specks and thin coatings. On the south side of Lake Superior, and consequently within the boundary of the United States, a vein of malachite has been noticed, which may, upon examination prove of importance.—(See 1st vol. of the Transactions, pages 26 and 36.)

Ores of copper are much more usually found in primary than in secondary rocks.

ORES OF GOLD.

Gold has not been noticed in Canada, but so near the frontier as to induce me to give the following extract from an American paper, the particulars of which there appears to be no reason to question the accuracy of:—

"VERMONT GOLD.—We some months since noticed the discovery, in Vermont, of several specimens of the precious metal, and now learn, from the *Boston Traveller*, that it has been analized by General Field, who has forwarded a specimen for the Havard University. The *Traveller* states that 'the gold was found in the high way, deposited with a quantity of clay, sand, and gravel; the soil was alluvial, and upon examination it appeared to have been brought down and deposited by a small rivulet, from a high hill. The specimen of gold when found, weighed 8½ ounces, was of a conical form, and had firmly adhering to its base a number of small transparent rock crystals. The gold is soft, ductile, flexible, and malleable. Specific gravity 16-5, and the lustre that of virgin gold. The soil of the region is argillaceous, affording beds of excellent potters clay, and the rocks *in situ*, are all of the primitive class.'"

Professor Eaton says in No. 1 of the 18th vol. of Silliman's Journal, page 52 :—" If General Field's specimen of gold, found in Newfane, Vermont, was a native specimen, we may anticipate the discovery of gold in the talcose slate, from Georgia to Canada, along the east side of the green mountain range."—(Note 9.)

Gold is far from being of rare occurrence; it is said indeed, that the sand of few rivers is entirely free from it, although the proportion, in almost all cases, is so small as to be undeserving of notice, in a commercial point of view.

Mica and talc often resemble in colour, *external* lustre, and flexibility, the native ores of gold and silver. The former earthy mineral is sufficiently distinguished from these, by its elasticity, specific gravity, and want of the *true* metallic lustre. Talc is distinguished from them by the two last characters.

Gold, *in situ,* is almost entirely confined to primary rocks ; it has been observed, however in secondary. But it is among the alluvial deposits that it is more generally found.

ORES OF ANTIMONY.

Antimony, as an ore, has been said to have been frequently met with, but I know of no locality. It has been supposed to exist in the neighbourhood of St. Paul's Bay, L. C.

ORES OF LEAD.

SULPHURET OF LEAD.—GALENA.

Lead, as a sulphuret, has been found in many places, particularly near Lake Memphremagog, L. C. where it is said to occur in great abundance. Silver also has been reported to exist in the same place, put there appears to be much greater certainty of the presence of the former than

of the latter, as a distinct ore.—(Note 10.)

The Indians are said so know of several localities of lead ore; but there appears to exist a tradition among them, which is inimical to their making disclosures on such subjects. Many individuals have seen fragments of ore which the Indians bring down the Gannanoqui. Those I have seen, however, myself, were small and unpromising in their aspect. Some of the Indians are said to supply themselves with bullets from the ore they find, but this is very doubtful.

Native lead, a very rare ore, has been said to have been observed in Ohio, near the mouth of Au Glaize River, where it is described as occurring in slips, or slender prismatic masses in crystallized galena.

Ores of lead hold much the same geological position as those of silver, and may therefore be also expected to occur frequently in these provinces.

ORES OF ZINC.

Ores of zinc, in small disseminated portions, are not uncommon in the country. It is the sulphuret of that metal which is usually found, the black, and more rarely the yellow, blende. It is worthy of remark that, at Kingston, the sulphuret of iron, the sulphuret of zinc (Note 11), and sulphuret of strontian, are often associated together in the same hand specimen.

The red oxide has been named as a Canadian mineral, but its locality is not described.

These ores are found usually in primary rocks, but they occur also in transition and secondary, particularly in compact limestone. The yellow sulphuret is supposed to belong to the oldest formation of zinc.

ORES OF MERCURY.

No ores of mercury have been observed in the Canadian territories; but on the shores of Lakes Erie and Michigan, in the United States, it is said to occur as a sulphuret, mixed up with sandy alluvium.—(Note 12.)

Mercury is found sparingly in clay slate and secondary limestone,—most abundantly in the sandstone and shale, of the coal formation; and, as in the present instance, sometimes in alluvial deposits. It is among the most recent of ores; iron, and perhaps manganese being the only two which had been deposited subsequently.

LOCALITIES OF METALLIC MINERALS.

IRON.

IRON, OXYGEN.—(NOTE 13.)

Magnetic Oxide of Iron—is abundant in the townships of Marmora, Belmont, Camden, and Houghborough, U. C.

.. .. at Hull on the Ottawa—abundant.

.. .. in the rear of St. Paul's Bay, L.C. —abundant.

.. .. in the rear of the Seigniory of Batiscan.

.. .. in granite, near Tadousac (Note 14)

.. (*iron sand*) on the shore of the St. Maurice, above the forges, L. C.—in profusion.

.. .. on the shore of the St. Lawrence, between Tadousac and Moulin a Baude.

.. .. near Kingston, on the northern shore of Lake Ontario—very fine, with garnets.

.. .. in profusion on the north-eastern shore of Lake St. John, L.C.

Specular oxide of Iron—in sienite at Marmora.

IRON OXYGEN WATER, &c.

Red oxide of Iron, (pisiform)—on the eastern shore of Beverley or Henderson's Lake, on the Gannanoqui river, U. C.—a large bed.

Red oxide of Iron, (*compact*)—north east of Lake Echemin, L. C.
.. (*black hematite*) Encampment Douce, Lake Huron.
.. (*scaly*) same place.
.. (*red ochre*) on Lake Superior.
.. .. Marmora Works.
.. .. with the pisiform variety, on the Gannanoqui.
Brown oxide of Iron "crystallized and otherwise," is met with on the islets of Gargantua.
.. (*yellow ochre*) Marmora Works.
.. .. St. Augustin, Lake Calvaire.
.. .. on the Magdalen Islands.

IRON, OXYGEN, MANGANESE.

.. (*umber*) at Beauport near Quebec, L.C.

IRON, OXYGEN, MANGANESE, PHOSPORIC ACID, &c.

Argillaceous oxide of Iron (*bog ore*)—township of Marmora.
.. .. .. seigniory of Champlain.
.. .. .. seigniory of Batiscan.
.. .. .. River du Loup (upper end)
.. .. .. in rear of St. Paul's Bay.
(*Extracts from Gourlay.*)
.. .. .. at Charlotteville, eight miles from Lake Erie, —abundant, (Note 15.)
.. .. .. township of Trafalgar, U. C.—much.
.. .. .. township of Bertie, do.

Argillaceous oxide of Iron (*bog ore*)—township of Stamford, U. C.

.. .. .. township of Grantham, —great plenty.

.. .. .. township of Pelham—a little.

.. .. .. township of Crowland, —a little.

.. .. .. township of Canborough —some.

A variety of the argillaceous oxide of iron is found at Marmora, in a thick bed in sienite.

Iron Ores, (species not mentioned)—in the townships of Westminster and Dorchester; also in great abundance in the township of Leeds.

IRON, OXYGEN, CARBONIC ACID.

Argillaceous oxide of Iron,—(*clay iron stone*) is found half an inch thick, forming a vein traversing Amygdaloid, at Point Mamaise, Lake Superior.

There is said to be a rich ore of iron at the base of Long Point, (U. C.) but its species has not been named.

CARBONATE OF IRON.—SPARRY IRON ORE.

IRON, OXYGEN, CARBONIC ACID.

Sparry Iron Ore,—Marmora Works, U. C.

.. with pearl spar, forming a vein in grey wacke at Dr. Mills's quarry at Cap Rouge, L. C.

.. (pseudo volcanic) in the township of Yonge, U. C.

.. in sienite or greenstone, Kingston Mills.

SULPHURET OF IRON.—IRON PYRITES.

IRON, SULPHUR.

Only the most remarkable deposits of this species will be mentioned.

Sulphuret of Iron,—An island on the south shore of Drummond's Island, Lake Huron, has been described as almost entirely composed of it. It is also found in large quantities on an island off the north coast of Drummond Island.

.. on an island in the eastern part of Neepigon Bay, Lake Superior.

.. at Becketts Mills, Short Hills, Niagara District—a large bed.

.. in the township of Elizabeth—a large bed

.. in the township of Yonge, U. C. (Note 16.)

.. on Lake Ontario near Kingston, with sulphuret of zinc and sulphuret of strontian.

.. with magnetic iron, in the township of Marmora, U. C.

.. in a course limestone conglomerate, which forms a precipice on the northern side of the town of Quebec, the three following varieties of iron pyrites are found, viz :—1st, polyhedral shaded masses, about the size of a bullet.

2d, radiated iron pyrites.

3d, hepatic iron pyrites. These varieties are found in a species of shale, much decomposed, which often sur-

Sulphuret of Iron,—

rounds the blocks of limestone in this conglomerate. The hepatic variety partakes sometimes so much of the general decomposition of the shale it is found in, as to have lost its metallic lustre and specific gravity.

.. twin crystals of cubic iron pyrites have been observed disseminated through some of the clay slate in the district of Quebec. If one of two cubes of metal of the same dimensions, be cut in a particular manner, it is possible to put the other through it; the appearance of these twin crystals is similar to what would be observed in trying this experiment.

.. a large deposit associated with gypsum, on the Magdalen Islands.

PLUMBAGO.—CARBURET OF IRON.—GRAPHITE.

CARBON, IRON.

Carburet of Iron,—in the township of Houghborough.

.. .. at Hull on the Ottawa, mixed up with magnetic iron.

.. .. disseminated through several of the rocks between these two places.

.. .. on the shores of the Gannanoqui, and in some other places, chiefly in the eastern section of the Upper Province.

.. .. in amygdaloid at Point Marmaise, Lake Superior.

.. .. Hawksbury on the Ottawa.

Carburet of Iron,—in a creek near Kingston—query, what creek?

.. (*graphite slate*)—on Judge Taschereau's seigniory of St. Mary's, L. C.

.. .. near the Furnace Falls, on the Gannanoqui.

MANGANESE.

OXIDE OF MANGANESE.

MANGANESE, OXYGEN, WATER, &c.

Earthy oxide of Manganese,—(*wad ?*) at Sillery near Quebec.

COPPER.

NATIVE COPPER.

COPPER—PURE.

Native copper in large detached masses near or upon the southern shore of Lake Superior. This is obviously not a Canadian locality, but it and similar notices should not be omitted in a compilation like the present.

Native Copper,—disseminated through tabular masses on the beaches of Isle Royale, in small plates, grains, and wires. From the appearance of these masses, Captain Bayfield, R. N. supposes them to have originally formed veins in a dark brown porphyritic trap, and from their untravelled form, that they are near the parent rock.

.. in small masses on the beaches of Point Keewowanan Lake Superior.

SULPHURET OF COPPER.—COPPER PYRITES.

COPPER SULPHUR.

Sulphuret of Copper,—in small quantity in a confused mass of quartzy veins at the bluff at the lower end of the narrows of Pelletau, Lake Huron.

.. .. in small quantity in argillaceous schist at the mountain portage above Lake Superior.

.. .. in amygdaloid at Point Marmaise, Lake Superior.

.. .. encrusting the sides of an empty vein in greenstone near Michipicoten.

CARBONATE OF COPPER.

COPPER, OXYGEN, CARBONIC ACID.

Carbonate of Copper, (green)—in amygdaloid at Point Marmaise, Lake Superior

.. .. .. on the north shore of Lake Superior, many fragments of an impure green carbonate of copper, of an untravelled aspect, are found.

.. .. .. as a trace upon many of the rocks in these provinces.

.. .. .. in a vein of considerable dimensions on the east point of Copperas Harbour, Point Keewawonan, south shore of Lake Superior.

ZINC.

ZINC OXYGEN.

Oxide of Zinc, (red)—it has been said that this variety has been meet with in Canada, no locality however is given.

SULPHURET OF ZINC.—BLENDE.

ZINC, SULPHUR.

Sulphuret of Zinc, (black blende)—with fine radiated sulphate of strontian, sulphuret of iron and flesh-coloured calcareous spar, in a compact silico alluminous limestone on the northern shore of Lake Ontario, near Kingston.

.. .. (*yellow*) do. do. not so common.

.. .. .. in black and grey limestones, from Bytown, it is disseminated in very small crystals according to Dr. Holmes.

.. .. (*black*) in calcareous spar, do.

LEAD.

SULPHURET OF LEAD.—GALENA.

Sulphuret of Lead,—in the township of Patton, near Lake Memphremagog.

.. .. one mile upwards from where Craig's road crosses the river Nicolet, in the township of Chester, L. C.

.. (*argentiferous*) in a white marble, mixed with chlorophane from St. Paul's Bay, L.C.

Sulphuret of Lead,—

.. (*common galena*) Hawksbury on the Ottawa.
.. .. Fort Wellington, U. C.
.. .. north-west of Lake Huron.
.. .. somewhere on the shores of the Gannanoqui.

TITANIUM.

TITANIUM OXYGEN.

Oxide of Titanium,—it is probable that this mineral enters into the composition of much of the magnetic sand of this country as it frequently does in others.

TITANIUM OXYGEN SILEX LIME.

Silico calcareous oxide of Titanium, (*sphene*)—is found, according to Dr. Holmes, at Grenville, on the Ottawa

MERCURY.

MERCURY, SULPHUR.

Sulphuret of Mercury,—on the shores of Lake Erie and Michigan, in the American territories.

NOTES

ON THE

LOCALITIES OF METALLIC MINERALS IN CANADA.

NOTE 1.

The iron establishment in the township of Marmora is situated at the upper end, or north-western extremity of a peninsula, formed by the Bay of Quinte on the south-east, the Moira on the east round by the north, and the Trent on the west and north-west. The mouths of the Trent and Moira, on the Bay of Quinte, are about ten or twelve miles asunder, but in the latitude of the Marmora works, owing to two branches diverging from the main course of their respective rivers and approaching each other, there are only three or four miles of interval between the two waters. That branch alluded to which diverges from the Trent about forty miles from its mouth, is called the Marmora or Crow river, and it is upon the left bank of this river, about nine miles upwards from its junction with the main branch, that the works are situated.

The Moira river is one succession of rapids and falls, and is the principal seat of the mills in that part of the country. It cannot therefore be looked to as affording any expectation that it will ever be rendered navigable. To render the Trent navigable would not be attended with so much difficulty, but it would still be considerable, for although no falls occur for thirty-five or forty miles from its mouth, there are several rapids and shallows, which would require the construction of locks and dams, and the lowness of the

shores are unfavourable to the erection of such works.—Bearing in view this latter circumstance, the difficulties to be overcome will be better understood by introducing here the following description, for which I am principally indebted to Mr. Manahan, the superintendant and one of the proprietors of the Marmora works. At its mouth the Trent is about seven hundred feet wide; one mile upwards it ceases to be navigable even for boats, owing to rapids and shallows, which continue for eight miles. Mr. M. thinks that a dam constructed at the foot of these rapids where the banks will allow of its being twelve feet above the river would throw two or three feet of water upon the highest shallows and consequently absorb the rapids; that is, he supposes, that the river has only a fall of nine feet in these eight miles.* From the head of these rapids the river is navigable for seven miles, five of which hold the same course as before, that is from the north. Here the river bends suddenly to the westward, which direction it maintains for perhaps eighteen miles, after which it again turns to the north and continues with that bearing until it reaches the confluence of its waters with the Crow or Marmora river, a further distance of about nine miles.—From the angle of the first bend, I believe it has been proposed to carry a canal nearly in a right line to the works, distant about sixteen miles. Beyond the seven miles which have been described as navigable, a small rapid occurs commonly called Chisholm's Fall. Here much of the water is diverted by a bay, the daming up of which, it is thought, will throw sufficient water on these rapids to render them navigable for boats. For sixteen miles further

* This fall of nine feet is assumed merely on estimation, it may be more.

to the "Percey Landing" the river is navigable for steam-boats; here shallows and rapids again occur for three miles to what are called the "Big Falls," on the Trent.—A navigable channel for boats, through these rapids, might be obtained, it is said by the removal of some of the many boulders which here crowd the stream. In all the course of the river thus far there is not one very favorable situation for the construction of a dam, the most so is that which has been mentioned, near the mouth of the river. The "Big Falls" are occasioned by the river running over a ledge of limestone rock about eighteen feet high—above the falls the river is one continued rapid to the "Middle Falls" a distance of five miles, these falls are at the foot of Crow Bay, about one mile or more from the confluence of the two rivers. Pursuing the Marmora or Crow river to the right it is navigable for two miles, where a succession of rapids and falls continue for one mile. Hence it is navigable for two miles further, after which a winding rapid of about one hundred and fifty yards in length is met with. A further distance of two miles of navigable waters brings you to the first falls below the iron works, and distant from them about two miles, which are navigable. The main branch of the Trent to the westward communicates with the Rice Lake and Otonibe river, interrupted by one heavy fall called "Healey Fall" and partial shallows.

The general character of the soil between the Trent and the Moira is good, which is sufficiently indicated by the description of timber upon it. As the works are approached, however, a considerable change for the worse is perceived. The limestone which had been previously well covered up by soil, gradually obtrudes itself upon the eye, until at last little is seen upon the surface of the ground besides its dry

and whitened tables. In other places we meet with swampy land rendering necessary the disagreeable description of primitive road known in this country by the name of corduroy bridge. Indicative of this change the pine and a scanty herbage takes the place of the elm, the oak, the beech, and the maple.

Having afforded all the information I possess respecting what is generally understood by the term topography of a place, I proceed to give its geological and mineralogical characters, as far as my acquaintance with the subject will permit.

The greatly predominating formation from the Bay of Quinte to the Marmora works in one direction, and from the Moira to the Trent in another, is transition limestone, the same as that found to characterize Kingston and much of its neighbourhood. A line drawn from the Marmora works, about thirty miles northward of the mouth of the Trent, to Kingston mills, five miles northward of Kingston, would probably pass in every part of it, very near to the line of junction of the primary and transition rocks, and mark the limits on that side to the limestone I am speaking of. The characters common to this limestone in general, at least wherever I have consulted them, are, 1st—light bluish grey colour; 2d—a slight degree of translucency, usually on a thin edge; 3d—a compact structure in most cases; 4th—a fracture often approaching conchoidal; 5th—the odor of flint when struck, and not of bitumen. Its organic remains are also characteristic, among these may be named producta terebratulæ, orthoceræ, trilobites and encrinites; these are found in the surface and upper strata, more rarely below them, and apparently not at all in the lowermost. The orthoceratites for their size, often

demand particular attention—a portion of one in my possession from the surface stratum near Kingston must have been five feet long and two feet in its greatest circumference, they are seldom very distinct, and generally occur in a rubbly limestone on or near the surface. The terebratulæ appear to hold the lowest position in a fine semi crystalline limestone.

The minerals which have been noticed either imbedded or disseminated in this formation, are likewise characteristic of it. The earthy varieties are chert or hornstone, basanite, chlorite, calcareous spar, and sulphate of strontian. From the hardness and flinty aspect of some portions of the strata they appear to be passing into chert, while well characterized hornstone is occasionally seen forming prominent concretions on the surface of the limestone.—On the shore of Garden Island, opposite Kingston, concretions of hornstone looking like blotches of tar or pitch, are very conspicuous, they have even the pitchy lustre in fracture, the same as is noticed in the limestone at the Marmora works, although there the pitchy resemblance is not so perfect. Ovate convex concretions of basanite are not uncommon—they are good touch-stones. A green mineral, supposed to be an earthy chlorite, is often much mixed up with the ingredients composing the lowermost strata.

Calcareous spar often forms narrow viens in the middle and uppermost strata and rounded concretions in the lowermost.

Sulphate of strontian occurs like the foregoing, forming spherical concretions in the lowermost strata.

The metallic minerals are sulphuret of iron and sulphuret of zinc, (black and yellow blende). The sulphuret of iron

is thickly disseminated through some of the limestones in the middle of the series, and also in larger crystalline pieces among the lowermost strata, with sulphuret of zinc, sulphate of strontian, and calcareous spar—the whole forming rounded nodules in the limestone. These nodules, often entirely composed of fine light blue radiated sulphate of strontian, are sometimes as large as a child's head, and when detached from the limestone, which they are very easily, a very fair imitation of a trencher, or soup-plate is observed. This limestone has the aspect of being more sileceous and alluminous than that lying above it; and differs from it also by possessing nothing of a crystalline character,* which the other does, for although in both cases the structure is compact, in the former the fracture is dull, while in the latter it is glimmering, arising from the reflection of light from the polished surfaces of minute laminæ.

The limestone formation I am describing, has a stratification which is nearly horizontal, except where, by the apparent upraising of the older rock beneath it, since it was deposited, a partial uncontinuous dip of the strata is occasioned. These strata are sometimes separated by thin seams of shale.†

* Although not crystalline, some of this limestone, as it lies on the shore, in nearly horizontal strata, resembles basalt in form exceedingly. Mr. Finch, of New York, now lecturing at Montreal, was particularly struck with this feature in the limestone.

† The limestone of Kingston, the groundwork of the foregoing description, is characterized in some places by a remarkable concretionary structure, which may be thus described:—ovate, or rounded portions of the limestone are separated from the main body, by thin partings of shale, the wanderings of the edges of which shale upon the surface of the limestone, has been aptly compared by Dr. Bigsby, to the sutures of the human skull. These concretions are easily separated from the main mass, and exhibit the shale generally surrounding them on all sides except the uppermost. This shale

It will be perceived that the foregoing description of this formation, contains much which is of a very local nature, as far as regards opportunities of observation, and this must be the case with all observations on the same subject for many years to come, until the clearing of the country shall open a better view of its geology and mineralogy to the notice of the traveller. But I feel convinced, in the mean time, that future examination will not discover any characters in this formation essentially different from those here given, although facts of geological and commercial interest, may doubtless be elicited.

The older rock I have alluded to, as underlying this limestone, is at all times one of these four—a sienite, or greenstone, a sienitic granite, or sienitic gneiss. They appear to pass one into the other, and to have a contemporaneous formation. As hornblende appears to be rarely absent, without it be to give place to epidote, the presence of which is very characteristic of these rocks, they may be called amphibolic. As to the question, whether a genuine granite occurs within the limits I have described, I am of opinion that it does not, without it be as veins traversing the other primary rocks. Mica is a rare ingredient in them, and it appears to be in almost every case accompanied by hornblende. As to the stratification of these rocks, when most assuming that appearance, it is an ambiguous case, whereas in the majority of instances, no signs of it exist. Wherever the limestone prevails, the country is flat and tabular, rising sometimes in terraces, and always

when first exposed to view, is of remarkably plumbagenous lustre, and being marked with small pilastres, something like those on a stove, fluted columns and flat surfaces, its appearance is at once singular and pleasing. Its lustre however, does not continue without means being taken to preserve it, as exposure to the air changes its colour to a dull brown.

nearly horizontal. Where the older rocks come in, the surface is strongly undulated, sometimes rising in mamillary masses of bare rock, at others in higher projections, but almost always of a rounded form.

Such is a description of a few of the features of this part of the Upper Province, merely intended as introductory to a more ample detail of the rocks and minerals in the neighbourhood of the Marmora works, to which I now return.

The Marmora works have been described as being seated on the left bank of the Marmora river, about thirty miles by land from the mouth of the Trent. The road between these two places runs, for much the greater portion of it, if not entirely, over the transition limestone which has been described.

This limestone in general is tolerably well concealed by a soil, which, in most instances, affords good farms. As the works are approached the soil becomes gradually more scanty and the dough white surfaces of tabular masses of limestone frequently present themselves to view. When the visitor approaches within sight of the works little besides a pavement of the same is beneath him. These exposed masses separated from one another by small cross fissures are split and corrugated, and have much the same appearance that fine wheaten dough would have if its surface were cut and cross cut with an axe or wedge.* These appearances, probably the result of frost, are characteristic of much of the limestone of the district, and may be seen to great advantage near Kingston.

The limestone immediately at the works forms three

* Small markings on the surface of the limestone like the impressions of crows feet are not uncommon in the vicinity of Kingston, they may with probability be attributed to frost also.

distinct terraces rising one above the other. The lowermost is nearly on a level with the water—the next, on which the principal buildings are constructed, is from fifteen to twenty feet higher, and the third may be about fifty feet above the river; on the opposite side of the river the limestone forms a cliff nearly perpendicular, and of about the same height. An anonymous writer in No. 2, of the *Canadian Review*, states the whole body of limestone here to be two hundred feet high, this I think greatly overrated, one hundred is certainly the outside. He also says that an argillaceous sandstone of a red, grey, and green colour is found at the lower terrace, forming alternating layers; this is a mistake, these stratified masses are limestones, as their free effervescence in acid declares them to be—neither are they seen resting on sienite, although they may be fairly presumed to do so, as that rock crops out near at hand. The cascade is caused by its appearance, and it is seen in many places above on the left bank of the river, but the limestone conceals it on the right bank. Its constituents appear to be red felspar and light green epidote.—I did not perceive, as in the neighbourhood of Kingston, the actual contact of the sienite and transition limestone, although they were separated by a very few feet of soil and verdure, which of course concealed it, if it takes place; neither did I perceive that conglomeration in the limestone near the sienite, which is so remarkable near Kingston, where masses of the sienite both round and angular are found imbedded in the lowermost strata of limestone or at the junction of the two rocks, (see the 18th vol. of Silliman's Journal.) Near this junction and forming a bed in the sienite is observed a white crystalline marble of a finer grain than any other I have yet observed in this country.—

Indeed, the marbles in Canada hitherto discovered, are generally remarkable for their laminar structure. In hand specimens, this marble is almost as fine as the Carrara, but it can not be employed for sculpture, as it does not appear that solid blocks of it can be procured. This marble is again seen forming a mountain mass on the side of Crow lake, nearest to the works. It is here penetrated by hornstone, which in consequence of its more durable character, projects in ribs and concretions from its surface. If would be desirable to open a quarry here in order to see if the marble improved upon sinking into it, which is very probable. It is here associated with quartz rock, of which the largest portion of the mountain appears to be composed. This rock is stratified, and its strata are nearly vertical and directed about north and south.

What geological and mineralogical facts I have further to communicate will be stated in giving a description of the different ores of which there are at least eight distinct deposits.

FIRST ORE BED.

Commencing with those ores close to the works, on the left bank of the river, they may be described as forming a bed or vein in the sienite. One extremity of the marble before mentioned falls obliquely upon the northern side of this vein, which has itself a dip and direction about north-east. This vein appears to be nearly exhausted, or if not it offers no sufficient inducement in the present day to continue its exploration while such an abundance of good ore can be so much more easily procured.

The ores which have been found in this vein are the following, specular oxide of iron, red and yellow ochre, sparry iron ore, and argillaceous oxide of iron.

MINERALOGICAL CHARACTERS.*

SPECULAR OXIDE OF IRON.

Colour on a fresh fracture lavender blue, externally rusty red,—opaque,—structure compact granular,—fracture uneven—lustre glistening metallic—yields to the knife but strikes fire under the hammer—*colour of powder dark brownish red*,—shape of fragments prismatic—*specific gravity* 4·9 *slightly magnetic—not soluble in warm muriatic acid*—infusible alone before the blow-pipe, but with borax forms a bead coloured by iron.

The characters in Italics have induced me to name this the specular oxide of iron, although it certainly possesses nothing of that brilliancy of lustre, and payonine tarnish so frequently characterestic of that ore.

It is found enveloped by the other ores and is the *only* one of metallic lustre among them. It should yeild 63 or 64 per cent. by calculation.

SPARRY IRON ORE AND RED OCHRE.

Colour dark red (Indian red,) with yellow laminar parts interspersed, sometimes these parts form a yellow band in the middle of the mass, which on a cross fracture by a strong contrast between the real and the yellow produces a pleasing effect—opaque—structure between earthy and laminar, the mass having the appearance of being composed of red ochre and sparry iron. The laminar parts have about the hardness of fluor, but the earthy portion

* It is perhaps necessary to say that in giving these characters or others which may follow, I have been uninfluenced by a communication in the 1st vol. of the Society's Transactions, in which the characters of a *few* of the Marmora ores appear. Having the advantage of the writer of that article, which a visit to the spot has afforded, my observations both on its rocks and minerals, erroneous or not, are at least unbiassed either by that communication or by any other.

yeilds to the nail and soils the fingers; specific gravity, 2-8. It rapidly effervesces and in a great measure dissolves in muriatic acid. Blackens in the exterior flame of the blow-pipe and fuses in the interior into a black scoria, which is generally magnetic. Sometimes, however, it requires to be roasted on charcoal with grease to render it so.—It is used as a flux for the other ores.

I observed another excellent variety of this ore cropping out of the ground near the works, but I cannot say whether it was a loose mass or otherwise, it had a crystalline structure and its colour was a mixture of brown and white. If in abundance it deserves to be explored.

RED AND YELLOW OCHRE.

These ores, or rather pigments, are too well known to require a particular description. They occur forming the sides of the vein. The yellow ochre is of an indurated description of that substance.

ARGILLACEOUS OXIDE OF IRON.

In the excavation a large mass of this may be seen; a passage has been opened through it, in order to extract the other ores. It is the predominating ore, but of too poor and infusible a character to be worked. It looks like some varieties of trap or shale, and although very tough and difficult to remove, when first exposed, the action of the atmosphere renders it very brittle, and even friable.

Colour, greenish black, with seams of a reddish and lighter green,—opaque,—structure imperfectly foliated, sometimes curved; fracture, uneven. It is easily scratched by the knife, even when hardest; powder, yellowish green —no lustre; specific gravity, 3-1; insoluble in acid; infusible before the blow-pipe, after exposure to which,

on charcoal, it becomes magnetic; to borax it communicates a lively greenish yellow colour.

GRAPHIC SLATE.

Associated with the above, and forming a sort of incrustation upon it, is a mineral which has been confounded with it. It agrees very closely, in all its characters but one, with graphic slate. This excepted character is the peculiar phenomenon which it exhibits when exposed to a candle or the blow-pipe, and which has not been mentioned by mineralogists as belonging to graphic slate. The moment it is exposed to red heat, it expands, exfoliates, curls up, and rapidly falls into powder. It has been mistaken for graphite, but the streak it communicates to paper, is very different to the shining metallic trace which the latter affords. On the contrary, it is quite dull black, like that of black chalk, of which species it appears to be unquestionably a variety. When first collected, it marks paper very freely, but after keeping it in a dry room, it does not do so as readily. Its specific gravity is 2-6. It is not in the least magnetic after roasting on charcoal, but to borax it communicates a yellowish colour, showing the presence of a small portion of iron.

These ores appear to hold the following relative position, —the argillaceous oxide forms the walls of the vein; the red and yellow ochre, with sparry ore, form the lining next the walls; and the specular ore is found in the middle, not however, in continuous masses, but rather in fragments.

Chlorite, scaly talc, and quartz, sometimes form veins in the sienite, which holds these ores imbedded.

SECOND ORE BED.

The next deposit of ore I have to describe is on the right

hand shore of Crow or Marmora lake, near to the entrance into it from the works, and a few hundred yards back in woods. There have been deposited two species of ores—the magnetic oxide, and the argillaceous oxide, (bog ore.)

The principal spot where the magnetic oxide of iron *comes to day*, a term employed by miners, to express its appearing on the surface, is on the summit of a hill. Here it may be *seen* forming a bed of about twenty feet long, by about three or four feet wide. Whether the rock be a true greenstone, in a geological sense, or not, I cannot determine, as it appears to be rather coloured by epidote than hornblende; it is, however, very tough, compact, and possesses no appearances of stratification. This bed of ore has a position nearly due north and south, as regards its longitudinal direction, and a moderate dip to the north.—The walls of the bed appear to be vertical, and may probably sink to the level of the base of the hill, as fixed masses of the same ore, in the direction of this bed are found there, according to Mr. Manahan. This ore belongs to that sub species of the magnetic oxide, called native magnet, as it possesses not only strong attractive magnetism, but as strong a repulsive one also; and it is worthy of remark that in this instance, as in some others which have been noticed by other individuals, the position of the poles in the ore, corresponds with that of the bed; thus I invariably found, after trying the experiment repeatedly, that that portion of a fragment which had a northern position in the mass before it was removed, relatively to the opposite portion, attracted the south pole of the magnet, and repelled the north, while the opposite portion possessed an influence upon the magnet, directly the reverse.

MINERALOGICAL CHARACTERS.

Colour on a fresh fracture, steel grey externally, sometimes rusted; opaque; structure, laminarly compact; fracture, uneven, somewhat conchoidal; lustre shining, almost splendid metallic. Its hardness is a little variable; some portions yeild to the knife, strikes fire when struck with the hammer; colour of the powder, glimmering black; specific gravity 4-6. No change in nitric acid, strongly magnetic with polarity. Infusible alone before the blow-pipe, but fuses with borax, in the exterior flame, into a greenish yellow glass; if the heat be increased it intumesces and becomes green, and ultimately when the essay is sufficient in quantity it forms an opaque black globule.

Sixty per cent. of iron may be expected from this ore.

The difficulty of extracting this ore is considerable, it would otherwise be better worth exploring than, perhaps any other in the township.

ARGILLACEOUS OXIDE OF IRON.—BOG ORE.

Bog ore apparently of the sub species called meadow ore, is found in alluvium on the banks of a small stream at the foot of the hill on which is found the ore last described; much of it is of so dark a colour and earthy a fracture as to be mistaken for an ore of manganese, (wad.) It occurs in bullet shaped and reniform pieces varying from the size of a grape shot to that of a large potatoe, mixed up with sand; occasionally it resembles the excrement of some animals. Mr. Manahan informs me that similar deposits exist in several places in the neighbourhood, but as they have not been sought for particularly, they are not unlikely to occur in many others. In this opinion I agree with him, as there is not perhaps a portion of any country abounding in rock

ore which does not contain frequent deposits of that which we are discussing, I cannot say in what quantity it is found in this spot, but as Mr. M. found it thickly scattered throughout the whole depth of eight feet, it must be tolerably abundant. He also informs me that there is ore, which upon examination appears to consist of decomposing epidote and magnetic iron, this is frequently noticed among the bog ore, a fact of importance, as it seems to indicate that the magnetic iron of this *locale* is in some abundance. The last mentioned ore is very easily fusible, and is found to improve the working of the furnace.

THIRD ORE BED.

At the western extremity of Crow Lake, in the township of Belmont, about four miles from the works, there is another deposit of magnetic iron, forming a bluff on the left hand shore. From hence the main supply has been obtained for carrying on the works. Its quantity appears to be almost inexhaustible, but the quality of much of it is not by any means so good as that before described, being mineralized by sulphur and epidote. There is, however, a large portion very good, which from that circumstance and the ease with which it may be procured and broken up, is at this moment the favourite ore. What this ore bed may lose with respect to the per-centage of metal it may yield when compared with the other, it much more than recovers by the facility with which it may be procured—*the ore boat accompanied by two or three men provided with a pic-axe, shovel, and sledge hammer, may go to this bed in the morning and return in the evening with fifteen tons of ore.*

Mr. Manahan has noticed that the ore from this bed rejected on account of its containing too much sulphur, does, in the course of two years or thereabouts, become

greatly improved; and also that the ore on the top of the bed, particularly those fragments which have been long lying detached and exposed to the weather, have undergone a similar improvement in their quality. This might be expected to take place *a priori* because a part of the sulphur in the ore thus exposed, becomes converted into sulphuric acid and sulphate of iron, in which state it is washed from the ore by occasional rains. At some of the ore beds and among the rejected heaps at the establishment, this change is actually seen in progress and may be known by a white powdery coating on the ore, having an astringent ink-like flavour. I have no doubt that if copperas works were established here, that article of commerce might be obtained at little expense, and with considerable benefit to the iron works, as besides freeing the ore from sulphur, its exposure to the atmosphere to attain that end would render it brittle and more easily broken up for the furnace.

With regard to the rock associations of this bed, they are seldom seen, as the bluff appears to be almost one solid mass of iron ore, but I believe it to be a compact felspar coloured by epidote, as a large mass in my possession, from this place shews that rock traversed by veins of the ore, large masses of crystalline epidote are also seen. The anonymous writer before alluded to thinks that "large unrolled masses "of granular quartz and coloured by epidote bespeak the "contiguity of that rock in situ," I suspect that the compact felspar above mentioned is what has been mistaken for quartz rock, as of that rock I saw no traces—that which I have ventured to call compact felspar, is certainly not quartz, for it fuses easily with intumescence into a white enamel.

MINERALOGICAL CHARACTERS OF ORES FROM THE HEAD OF CROW LAKE.

1st.—A specimen of ore taken from the summit of the hill where it is found in loose masses detached from the rock beneath them.

Colour, on a fresh fracture, steel grey, sometimes much modified by epidote, which is mixed more or less with all the magnetic ores from this district; structure, when not influenced by the epidote, is fine grained; cross fracture, uneven, but fracture is effected more easily in the disection of even rusty seams which traverse it, the colour of these seams is generally red, but sometimes purple; lustre, glistening metallic. It yields, but with considerable difficulty, to the knife and portions strike fire under the hammer; not so frangible as the last magnetic ore examined, which is owing to the presence of the epidote; when free from it the powder of the ore is of a glimmering black colour; specific gravity, an average specimen 4-1. It is magnetic, but not with polarity; insoluble in nitric acid. Its blow-pipe characters are much the same asthe last, and as that is the case with most of the ores I have to describe, they will not be given again unless to mark an important difference.

2d.—"The favorite ore" differs from No. 1 of the same bed, in being much more free from epidote and sulphur, and by occurring under a very slaty or schistose form, both of which circumstances render it much easier reduced to fragments for the furnace; it has also a greater specific gravity, viz. 4-4. It is very absorbent, and produces a hissing noise, when it is first placed in water.

3d.—This is of a light purplish steel blue colour on the recent fracture, but like most of the rest, rusty externally.

It contains specks of iron pyrites, as indeed does most of the ore from hence, it being under the form of sulphuret of iron, that the sulphur is present in the bed. Its structure is fine-grained, and fracture uneven; lustre, glimmering metallic; yields to the knife; powder, bluish black; no change in nitric acid; specific gravity, 4-3; magnetic, &c. &c.

4th.—This is like No. 3 in most respects; the form under which it occurs is, however, different. It is found in parallel layers with rusty surfaces between them. Its rectangular outline and steel grey lustre gives it the appearance of a piece of manufactured iron—specific gravity, 4-6. Mr. Manahan has observed that where fragments of ores are found of regular forms, they are sure to be of good quality.

5th.—Occurs as a cellular crust upon some of the other ores, from one-eighth to one-half of an inch in thickness. Colour, bluish black; opaque; structure, cellular and platy, the interstices between the plates forming the cells; fracture, uneven; lustre, pitchy and glistening; yields to the knife; very brittle; powder, snuff colour; specific gravity, 2-8; no change in nitric acid; magnetic, &c. &c.

The large masses of crystalline epidote which are found here, deserve some description, but I fear that the little acquaintance I possess of the crystallographic characters of minerals, will render it a very imperfect one.

Colour, a greyish or yellowish green; translucent on the edges. It occurs in masses composed of an assemblage of large crystals, crossing each other without order or regularity; these crystals appear to be four-sided oblique prisms. Fracture, uneven; lustre, between glistening and glimmering—some faces of the prisms have a shining lustre.

It scratches glass easily, but yields to the knife; a light grey streak; powder, grey and harsh to the touch; specific gravity, 3-1. In the interior flame of the blow-pipe it rounds into a shining green, globule, but this depends upon the size of the fragment, for if it be larger than it ought to be, as large as a pepper corn for instance, (a favorite term with mineralogists, the absurdity of which has been exposed by Griffin,) it will turn brown at the extremity, but scarcely round at all; on the contrary if a minute fibre be employed it will form a greenish or yellowish glass, with intumescence, and this observation applies in substance to many other minerals.

It appears to be characteristic of epidote that the portion of the essay in the exterior flame does not lose its colour.—Could its colouring principle be extracted it would probably therefore form a very permanent pigment. Iron pyrites is much mixed up with this epidote.

FOURTH ORE BED.

Beyond the last deposit on a western course at the distance of about four miles by land, (the water communication being circuitous and interrupted by two small rapids,) there is another large bed of magnetic ore situated on Belmont Lake. Having neither visited this place nor seen any of its ores, I can say nothing further respecting it.

FIFTH ORE BED.

Due west of the Marmora works, at the distance of three miles, and on the banks of a branch of the Moira river is another bed commonly called "Fosters Ore Bed." This deposit has been worked and a considerable quantity of ore taken from it. I cannot say that much more remains, because it appeared to me nearly exhausted, but Mr. Mana-

han, who has had better opportunities of judging, is of opinion that it is still abundant. As it was necessary to transport this ore to the works by land, having first extracted it from a tough sienite, the bed has been abandoned in favor of the ore on the Marmora Lake. Much of this ore is mixed up with calcareous spar, which, of course acts as a flux and assists its fusion, on this account it is sometimes used in the operations of the furnace to produce a hotter cinder.

It contains sulphur, but apparently not so much as the last bed. Its geological relations are the same, that is to say, sienitic, but it differs mineralogically in containing, besides calcareous spar, octohedral chrystals of iron and garnet. Dr. Bigsby, I believe, says manganesian garnet, but using a flux of borax and nitre, I never could develope before the blow-pipe the amethystine tint so characteristic of the presense of manganese, when in any quantity; the colour of the globule was always green or yellow, like that produced by iron alone. Garnet also occurs here in amorphous masses, and may be considered an ore of iron, although, a poor one; it is, however, very easily fusible and valuable on that account as a flux.

MINERALOGICAL CHARACTERS.

Several of the ores from this bed, so nearly resemble some of those which have been described as occurring in the main deposit on the Marmora Lake, that it is superfluous to describe them, I shall confine myself therefore to those which appear to differ.

1st.—Colour, steel grey; opaque; structure, laminar, the mass having a tendency to break into fragments of a rhomboidal shape, with smooth sides; cross fracture, uneven; lustre, shining, (almost splendent); resino metallic.

It resists the knife, but is very brittle, almost fusible. It is powerfully magnetic, but not with polarity; colour of powder, black; specific gravity, 4-9. In nitric acid it effervesces at first considerably, owing to the carbonate of lime between its laminæ. Before the blow-pipe it decrepitates like gallena, which it more resembles in appearance than any ore of iron I ever saw before, after which it seems to burn for an instant; in other respects its blow-pipe characters are the same as the other magnetic ores.

This is an excellent ore, as it bears its flux with it, and would probably yeild 65 per cent.

2d.—Colour, brownish or yellowish grey; opaque; structure, fine grained; fracture, uneven; lustre, glimmering, resino metallic; yields to the knife, though not easily, and affords a yellowish powder under the hammer; specific gravity, 3-5; not magnetic even after roasting on charcoal. In the interior flame of the blow-pipe it forms, like the garnet, a black globule which is slightly magnetic. It contains crystals of garnet and iron, which are always some modification of the octohedron, It is much mixed up with carbonate of lime, as its free effervescence in acid evinces, with borax it gives a glass coloured by iron.

This I consider to be amorphous garnet, a dark reddish brown variety of which is also met with.

The crystals of garnet are sometimes of a red, at others of a brown colour, but it is generally so intense as to render the crystals nearly opaque.

I have only one more observation to make on this bed, viz. that by a species of desquamation on the thin edges of the laminæ and along many of the lines of cleavage of the calcareous spar a peculiar feathered appearance is given to many of the clusters of its crystals.

SIXTH ORE BED.

Southwestward of "Fosters Ore Bed," about a mile, another is found on the border of a marsh. It has been worked and several tons of ore have been taken away, but like the last mentioned bed it has experienced a temporary neglect and for the same reason. Its ore, however, appears to be much easier extracted, and much more abundant.—Large crystals of iron upon the surface of some of the ore, and the pavonine tarnish on others, characterize this bed. It is magnetic, but contains much sulphur. Mr. Manahan, informs me that some portion of this ore is used in the furnace as an alloy ore, but other portions which are free from sulphur are equal to the rest.

MINERALOGICAL CHARACTERS.

1st.—As has been said, some of the ore in this bed is characterized by having large crystals of iron upon its surface. These crystals appear, like the garnet, to be always some modification of the octohedron. The faces of the crystals are oblique rhombs, and are striated in lines parallel to the largest diagonal. It is seldom that more than five faces can be seen, as the others are either obliterated by the body of the ore, or what is more probable, never were formed. This ore is darker than any of the preceding; of a compact structure; very magnetic; specific gravity, 4-6, &c. &c.

2d.—A course granular variety of ore is obtained here, the cross fracture of which shows the pavonine or iridescent tarnish. It is very magnetic, and has a specific gravity of 4-9.

Almost all these beds appear to have, as in the present instance, a dip and direction towards the north.

SEVENTH AND EIGHTH BEDS.

It is said that on the opposite sides of the marsh before-mentioned, there are two more beds, affording large quantities of that ore, which has the pavonine tarnish.

NINTH AND TENTH BEDS.

I heard of these two beds, and saw the ore from one, which was excellent, but cannot describe their localities.

Before I conclude this note, some notice shall be taken of two reports which appear to be in circulation. One on the discovery of copper in the neighbourhood of the works, the other on the probable discovery of coal, both said to have had their origin with Dr. Bigsby. With regard to the first report, it might very well be true, as the geological relations of that ore agree with those of the country it is said to occur in; moreover the native copper of the copper mountains, in this quarter of the globe, has frequently a matrix of epidote. I, however, saw no copper ore, neither, I think, did Dr. Bigsby, or he would have mentioned it in some of his geological papers.

As to the occurrence of coal, one species of it, anthracite, (the best adapted, when mixed with a little charcoal, for smelting iron) might be found. I met with nothing, however, to indicate the probability of finding it. With regard to bituminous coal, it is very propable that it will be met with in this part of Upper Canada, if it preserve in this country the same geological relations it does in Europe.

Among the prizes offered by the Society, is one for the discovery of coal. It would have been within reach, had it been offered for the best essay on the probability, or the improbability of finding it.

However imperfect the foregoing description may be, I

think that a sufficient number of facts, both geological and mineralogical, have been adduced, to render it highly probable that the limestone of this district is of the transition class, while the crystalline rock below it is of the primary order; one of the youngest, perhaps, (as Doctor Bigsby has said of the sienite of Marmora) of the older class of rocks. Whether the latter is to be called granite or sienite, appears to be a mere dispute about words, in which I shall take no part, conceiving that whatever the minerals may be which are present, either predominating or otherwise, that the different aggregates are of contemporaneous formation, and pass one into the other.

A question has been mooted out in this country, whether a genuine granite, that is an aggregate composed exclusively of quartz, felspar, and mica, of a very crystalline texture, and exhibiting no signs of a mechanical formation has been observed; as far as my experience extends, such an aggregate is very rare, nor can I say *positively*, that I ever saw such, under any other form than as veins traversing other rocks. Hand specimens may be frequently seen and collected, in which the necessary conditions appear to be present; but no individual, ambitious of being thought a geologist, will judge from such partial *data*. Let him cast them from him, and visit the rocks *in situ*, before he presumes to give his opinion; it will then be entitled to attention though it prove erroneous.*

* Captain Bayfield has, since the above was written, informed me that beds of genuine granite are occasionally met with on the northern coasts of Lakes Superior and Huron, although, in general, the granite of those districts is sienitic.

NOTE 2.

For information respecting the ore in rear of St. Paul's Bay, I beg leave to refer the Society to my communication on the subject, in the 1st and 2d vols. of its Transactions, pages 145 and 76.

The only new fact I have to communicate on the subject is, that a fragment of the ore which has been left neglected in a dark corner for some time, is now found to possess polar magnetism, although it previously was found to be deficient in any kind of magnetic influence whatever, before it was roasted, and which circumstance was particularly stated in one of the communications alluded to above.

NOTE 3.

The Gatineau river enters the Ottawa from the northward, about one mile and a half below the entrance into the Rideau Canal. It is navigable for steam-boats for about four miles upwards from its confluence with the Ottawa,—here rapids occur. About one mile and a half west of these rapids, a bed of iron ore is met with. It is situated near the summit of a mountain, in the township of Hull, L. C. and forms a vein or bed in the former from ten to twelve feet thick. It appears to traverse the mountain on a south-west course, having a vertical position as regards the walls of the vein. On the opposite side of the mountain, at the distance of upwards of a mile, and in the direction of the vein, ore was again seen in great abundance. From the quantity of ore seen in these two places, as well as in other parts of these high lands, no doubt is entertained that there is a considerable deposit of ore in this portion of Lower Canada.

Judging from surface specimens, the rock with which the iron ore is associated is a friable white marble, containing, like much of the ore, small particles of plumbago or graphite.

Wood for making charcoal and limestome as a flux, abound in the neighbourhood; and a water power to almost any extent may be commanded. The ore is often strongly magnetic.

The substance of the foregoing communication was sent to me, at my request, by Mr. Burrows, the overseer of works on the Rideau, who has been before mentioned.

It is very probable that the graphite mixed with the ore may prove an advantage in its reduction, by causing a saving in the expenditure of fuel, and also by exerting a beneficial influence upon the cast metal.

NOTE 4.

Iron sand often exerts a strong cementing power on the shores of the St. Maurice, &c., there are banks of sand so indurated by its presence as to resemble sandstone.

I have often observed, as probably others have also, that rivers which bring down this metallic sand deposit it in narrow low ridges upon the shore at *higher* elevations than similar deposits of the *lighter* sand, a fact at first not easily explained; upon more particularly observing what takes place, however, it will be perceived that these ridges are deposited upon the *return* of the ripple to its bed, consequently that sand of greatest spacific gravity falling first will hold the highest position.

NOTE 5.

The deposit here alluded to is situated on the eastern shore of Beverley or Henderson's lake, an enlargement of the Gannanoqui, in the upper portion of its navigable waters. It is about one quarter of a mile from the lake, on the opposite side of a cedar swamp, and on the summit of a small hill. An inhabitant of Beverley desirous of ascertaining whether it was in abundance or not, opened a portion of the ground about ten feet every way, and found a considerable quantity. He seems to have struck a vein of it at the depth of about eight feet, which dips towards the north-east. But it also appears in the section he has made in large heavy blocks on and near the surface. I examined the ground in several places to the northward and eastward of this excavation, and always found it near the surface, it was also met with to the westward. As I remained on the spot only twenty minutes or half an hour, it is not possible to pronounce as to the quantity in which it occurs, it however, appears to be considerable. To obtain positive information on this point, it would be necessary to cut a few sections or sink a few holes on the hill, which might be done at a trifling expense—an expense amply repaid by even the chance of finding an extensive bed of ore in so desirable a locality.

MINERALOGICAL CHARACTERS.

Only two varieties of ore occur here, red ochre and one (that predominating,) which possesses the following characters :—

Some parts are of a dark Indian red colour, and others iron grey ; opaque ; structure, pisiform or oolitic, the mass being composed of small globules of a reddish colour, and

unctuous lustre externally; a fracture shews these globules on one side, and the rounded concavities they have vacated on the other, these hollows are sometimes of an iron grey colour, at others Indian red. The globules resist the point of a knife, but the mass yields to it a light red streak; its powder also is of a lighter red than the mass. The structure of the globules is hollow, perhaps concentrically so, but they are so small as not to be easily examined on this point. The lustre of the ore is between dull resinous and shining metallic, but glimmering points and small laminæ of a higher lustre are frequently seen. The specific gravity is various, but it is between 2-9 and 4-6; no change in nitric acid. Before the blow-pipe it does not fuse, but turns black and magnetic. To borax it communicates the usual colour characteristic of iron.

I am not aware that a similar variety of the red oxide of iron has ever been noticed before. In its structure it resembles the "pisiform clay iron stone" of Phillips, but its frequent metallic lustre distinguishes it. It may be an intimate mixture of the two. Fluiry's name of "fer oxide globuliferne," is expressive of its appearance, although under that head he does not describe the same ore.

It has been said to smelt easily and to make very good metal. I am more doubtful of the accuracy of the latter statement than of the former.

2d.—The red ochre, besides coating the globules and the external surface of the ore, lines the sides of the veins and is much mixed up with the soil of the neighbourhood, indicating the proximity of a more solid ore. It is remarkable for its unctuousity.

If much ore of a good quality were found, which I am far from taking upon myself to say is the case, its locality is a

highly favourable one for working in. A few hundred yards of land carriage would bring it to the waters edge, from whence it might be transported down the Gannanoqui to the Furnace Falls, at which place every facility offers itself as regards water, wood, limestone and sandstone, for the establishment of Iron Works. By the construction of one, or at most two locks, the iron fabricated might be transported by water through the White Fish River into the Ridcau Canal, below Jones' Falls. Nor if it were desirable is the water communication with the St. Lawrence below the falls of difficult attainment—two or at most three locks would effect this also.

I propose to close this note with some observations upon the rocks and minerals met with in ascending the Gannanoqui.

The Gannanoqui enters the St. Lawrence from the northward about twenty-one miles below Kingston. Advantage has been taken of a fall at its mouth* to establish saw and grist mills, which from their favorable position, great popularity of their owner and the liberal expenditure upon them of a large capital, are considered to be the most flourishing works of the kind in the Upper Province.

Upon landing on the right bank of the Gannanoqui, at its mouth, a conglomerate was first observed, which was supposed to belong to the old red sandstone formation, that rock having been subsequently noticed forming a precipitous bank towards the St. Lawrence on the left shore of the Gannanoqui. This conglomerate however, was not particularly observed. The old red sandstone, as it is presumed to be, has the appearance of being horizontally

* About fifteen feet high.

stratified, but this feature was not very distinct, owing to the rugged nature of the section in which it was examined. The prevailing, though not the essential colour, was here present in this rock, varying from brick red to yellowish red passing into yellow. It is also characterized by those red spots and protuberances, which have been given, though I believe, erroneously as a certain type of this rock. The action of the atmosphere causes the exposed surface of the rock to crumble away leaving in many places where these spots occur mamillary protuberances : they are sometimes hollow, and then have the appearance of miniature craters, occasionally these spots yield to weathering more readily than the other portions of the rock, in which case rounded holes on the surface are seen an appearance very common in the detached masses of this rock, which are found distributed over the country. The structure of this sandstone is generally fine grained, but it is often that of a coarse conglomerate. Sometimes coloured streaks or bands parallel to each other and to the lines of stratification are very distinct upon a cross fracture. This formation appears to be contemporaneously the same as that with which the iron ore is associated in the higher portions of the Gannanoqui. It also appears to have been formed from the debris of a rock common in this part of the country, the constituents of which are very red felspar ; light blue opalescent quartz ; a small portion of green hornblende with occasionally a little mica. This quartz which is easily recognised, is frequently seen in the sandstone. The rock alluded to may be seen near Kingston and at the Furnace Falls on the Gannanoqui.

Beyond this sandstone, to the eastward, a point projects out towards the St. Lawrence, (which bathes its foot)

composed of a very friable limestone, often of so crystalline a structure as to resemble calcareous spar. It often contains specks of graphite, and sometimes parts of it are discoloured by what appears to be the green carbonate of copper. Its colours are whitish, yellowish, and reddish. Similar aggregates have been met with in sinking the lock pits on the line of the Rideau Canal, and in one instance it has been observed to have a geological position below the red sandstone.

This limestone is perfectly useless as a building material, and for lime it would not answer well, because it flies and falls to pieces and powder in the kiln. When the lime is required for immediate use, it might answer, but the quickness with which it would pass from a caustic lime to a carbonate, would render delay destructive of its power of fixing in a state of mortar, Mr. M'Donald, the obliging proprietor of the mills, procures all the lime he is in want of from Kingston.

About one mile from the mouth of the Gannanoqui the navigable portion of it begins, and continues as far as the "marble rock or falls," a distance of about ten or twelve miles.* As the geological features of this part of the river are interesting, I shall endeavour to give some account of them.

The waters of the Gannanoqui have here apparently forced a contracted passage through a hill of rock, leaving a section on either side, varying from twenty to fifty feet above the river. On the left bank this section is through talcose schist and serpentine,—on the right it is through marble. Granite also on the left bank is seen forming a

* About five miles by land.

perpendicular scarp about one hundred feet from the river, and the same number of feet above its level. The talc, in the talcose schist, is of that variety called silver talc, and its lustre is so strongly that of silver, as to be easily mistaken by the inexperienced for an ore of that metal, (Note 8.)— In this rock veins of larger crystals of talc, of a light green colour, and very pearly lustre occur; they vary from half an inch to one inch in thickness. Other veins about half an inch wide, also occur of a mineral which possesses the following characters.

MINERALOGICAL CHARACTERS.

Colour on a fresh fracture, white, which by exposure becomes yellowish. When dry it is slightly translucent on the edges, but being absorbent and hydrophanous, it becomes deeply translucent on the edges after exposure to the action of water, in which it softens, becomes brittle, and eventually falls into two or more fragments. Structure, compact; fracture in the small, either even or flatly conchoidal; in the large, owing to the interposition of brown mottled seams of a glistening enamel lustre, the fracture is undulated. These seams often exhibit peculiar fibrous markings of a brown colour, occasioned probably by incrustations of rock cork or rock leather; they render the mineral very frangible in the large; in the small, when dry, it is not so, but when saturated with water, it is even friable. Its lustre is dull, but it easily acquires the shining polish of enamel. It is scratched by calcareous spar, but not by the nail unless it has been previously soaked in water and is still moist. It has a slight argillaceous odor when breathed on, and is slightly adhesive to the tongue, with the flavor of chalk rather than magnesia.* It has a

* It has been said that the carbonate of magnesia, and the pure earth

very soft and unctious feel, both in substance and powder —specific gravity, 2 2-3.

In powder it is partially soluble, without effervescence in the mineral acids, and their diluted solutions. When tested with Prussian alkali, or tincture of galls, the presence of a proportion of iron, which the low specific gravity, and pale colour of the mineral in question would not lead one to suspect the presence of, is indicated. By evaporation salts of a white colour, acicular form, and the flavour of copperas, are obtained from its solution in sulphuric acid; sometimes a slight acidulous taste like alum is noticed, but never the nauceous bitter of epsom salts. Its powder in water communicates a blue colour to test paper. Its solution in muriatic acid does not redden flame.*

In the mattrass, if not perfectly dry, it decrepitates violently, and giving out its moisture it turns black.— Before the blow-pipe, if moist, it decrepitates violently, otherwise not, and turns black, but not magnetic. A small thin fibre-shaped particle fuses in the interior flame, into a dull white enamel, but slowly and with difficulty. A larger essay is impossible. With borax it forms slowly, a colourless transparent glass. It phosphoresces a little on a shovel heated below redness.

From its geological position, and some of its other characters, I was induced at first to consider this mineral to be

have no flavor by which they can be distinguished from chalk, and the fact that the character of flavor is entirely omitted by mineralogists in describing these substances, makes it appear that that opinion is generally entertained by them. With due submission, however, to such high authority, it seems to me to be an important character omitted, as I am almost certain that I could detect these minerals in a state of purity, by this character alone.

* See Silliman's Journal, vol. 18, No. 2,—"On the red colour of flame," &c. &c.

a hydrate of magnesia, but upon a closer examination it appears to agree better with that variety of hydrate of allumine, called henzenite by Cleaveland. It is just as likely however, to be one of the numerous family of clays, a bole, or lithomarge, for instance. It does not form a paste with water, and is not easily reduced to an impalpable powder.

A calcareous spar of the lustre of satin spar, and also sometimes of the same structure is found in thin veins in the rock. Its usual structure, however, is laminar, and the laminæ appear to be arranged diagonally as regards the sides of the vein, having their polished faces striated in narrow blue bands like the water lines on paper, parallel to the sides of the vein in which direction there are probably cleavages although none could be obtained.

A species of potstone or foliated soapstone is obtained under the same circumstances.

Hexagonal crystals of silver mica are found imbedded.

A beautiful enamel coating often fluted and of a purple, a green, or a reddish colour was seen upon the surface of some of the talcose schist forming the sides of the veins in which the supposed hydrate of allumine was obtained, also upon the satin spar. Advantage has been taken of the fall and of the rocky elevation on either side of it, to construct a dam and to establish a saw mill. On the left side of the saw mill and of the river, the serpentine rock is seen forming a perpendicular scarp. It is composed of the precious variety of serpentine, and appears to form a thick bed in the talcose schist. On the upper surface of this serpentine is seen in patches a thin white compact coating of a mineral, which bears some resemblance to the mineral before described, but it is found to effervesce and dissolve very

freely in muriatic acid and to form with sulphuric acid a thick curdy deposit of a white colour and perfectly tasteless. I am disposed to think it an incrustation of magnesian carbonate of lime, and the curdy matter an artificial gypsum.

The talcose schist lies between the serpentine and granite, which last mentioned rock rears it head in one perpendicular scarp above the others perhaps fifty feet. It is composed of felspar and quartz, with occasionally, black schorl, but no mica. Such an aggregate is a frequent member among those rocks in this country which are called granite. It has been called a granite here for want of a better name, but as its constituents have been given, a name can lead to no erroneous conclusions. It is very much to be wished that geologists would oftener condescend to give the constituents, &c. of the rocks they describe. In the difficult science of geology, as yet in its infancy, conciseness is well sacrificed for a detail which shall render its facts intelligible.

I have described marble as forming the right bank of the river at and near the dam; it does not do so, however, exclusively, as talcose schist is also there, but in subordinate quantity, and a short distance back from the shores granite is, I believe, as on the opposite side, also found. This marble sometimes spotted by serpentine, forming a *verde antico*, at others almost of a pure and brilliant white, forms an extensive bed some distance below the Marble Falls, but it is near them that that beautiful variety, checquered by serpentine has been found; it also occurs in large nodules imbedded in the limestone, and again one part of a mass is white marble—the other serpentine. This serpentine is of the purest kind, being of a very vivid green colour and very translucent. The marble with which it is associated

is generally of a compactly laminar structure and white colour. It takes, I believe, an excellent polish, and when, as is frequently the case, the spots of serpentine are round, small and thickly distributed, no handsomer material of the kind can be found, nor one better adapted for many ornamental purposes. It is so easily worked that rings have been made of it. Blocks of almost any required size may, I believe, be obtained, but of this there is no positive certainty, because no quarries have yet been opened, although it is said that they are about to be.

But it is not the *verde antico* alone which demands notice. A good description of white marble is found also here in large quantities, and although I have seen none which would answer the purpose of sculpture, it is very probable that it may be found, if sought for. Its colour is tolerably uniform, but some of the marble contains small crystals of a brown mineral and occasionally parts are grey rather than white. Its structure, as has been said, is compactly laminar, the mass being composed of small laminæ with polished faces closely aggregated. It is harder than white marble usually is, but effervesces freely in muriatic acid.—It is deeply translucent on the edges. For building, and for almost every purpose to which limestone is applied, it would answer well, and judging from what I saw, it would appear that any quantity might be obtained. About one mile below the falls it is seen in greatest abundance, apparently overlying serpentine, and forming with that rock a perpendicular cliff about twenty or thirty feet high. In short there appears to be an immense marble quarry in this part of Canada, the limits of which have not been ascertained

The water retained by the dam at the marble rock is

about twenty-five feet above the St. Lawrence and six feet above its natural level. Above these falls as far as the "Furnace Falls," (about twenty-five or thirty miles* *by water* from the mouth of the Gannanoqui,) the river is so nearly upon a level that rafts will not descend with the stream unless they be assisted by a favorable wind. The shores of this river are generally low, and I should conceive that much the highest portion of the country, at least on the shores of the Gannanoqui, is on the summit of the granite aggregate, on the left bank of the river at the "Marble Falls."

It has been before said that the rock at the Furnace Falls is a granite composed of red felspar, bluish quartz and green hornblende. It forms on the Gannanoqui; here a cascade of about fourteen feet in height, which gives motion to a flourishing saw and grist mill. I saw close at hand a reddish crystalline marble with points of graphite disseminated, and I heard of large deposits of excellent sandstone and graphite slate in the neighbourhood, but being hurried, the principal object of the visit to these parts, viz. to see the deposits of iron ore, engrossed most of my attention.—One deposit only was seen, that which has been described, but the occurrence of others was mentioned, the localities of which from description were not of so favourable a nature as regards the transport of ore.

At my request Mr. Burrows, an intelligent overseer of works on the Rideau, lately sent me some notes and specimens of rocks found near or on the line of the Rideau Canal from the Cranberry Lake to Kingston Mills. I propose to condense these notes and combine with them my own observations.

* Only fourteen by land, so circuitous is the course of this river.

1st.—Between Cranberry Lake and the strait leading into Dog Lake, the old red sandstone, in nearly horizontal strata occurs. It is described as being in very thick beds, and to dip away in several directions as south-east, west, south of west and north-west at a variable angle of from 5° to 10°. It is red and white in bands parallel to the lines of stratification, and resembles very much a red sandstone, which is purchased in the United States for the use of the iron furnace at Marmora, for which purpose, I think it would answer, but experience must decide that. From the creeks or south-east outlet of Houghborough Lake, an inferior sandstone, apparently belonging to the same formation is procured, some of the sandstone from hence is a species of grey wacke.

2d.—Is a black limestone of a very compact structure, and somewhat flinty aspect. It is transported from near Auley Mills to Jones' Falls, and burnt for the supply of lime for that place. No limestone having been discovered nearer; it is described as being situated on a high ridge.

3d.—Sandstone from a high ridge between the lakes at Brewer's upper mill, and the quarries described under No. 1. It is close to the line of the canal, horizontally stratified or nearly so, and superincumbent to a mass of very friable white and grey crystalline limestone. This sandstone is of a yellowish white colour.

4th.—Is the friable crystalline limestone alluded to above, and which, from the looseness of its laminar texture, friability and colour, resembles some calcareous spars. It was also alluded to in describing a similar aggregate at the mouth of the Gannanoqui. It is described as underlying a sandstone, which I venture to name the old red, simply from the fact that wherever it is found in this country, it

appears to be either in immediate contact with primary or transition rocks or if any rock containing organic remains is found above it, these remains always indicate an older formation than the red marl or *new* red sandstone—the only one it could be mistaken for. Admitting that it is the old red sandstone and that that rock is the last of the secondary, the one beneath it must be of the transition class, which its texture and structure corroborates, the former too loose for a primary rock and the latter too crystalline for a secondary, besides which a similar aggregate as has been described, is associated with graphite, a mineral seldom met with above the transition class. This limestone possesses one character that may be considered some what at variance with these views, viz. when struck it gives out a strong odour of sulphur.

5th.—In excavating a lock-pit at Brewer's mills, Mr. Burrows met with the following rocks in the order set down. He is not positive, however, that some of them were not boulders, but thinks that if they are they must be very large ones. The superincumbent rock forms a stratum of about one foot thick, adapting itself to the shape of the mass it rests upon. It is a crystalline aggregate composed of black hornblende, which predominates, mica, felspar and quartz. The rock it lies upon is a crystalline limestone, resembling No. 4, but not so loose in its texture. If these rocks are *in situ* and their relative position correctly given, the fact has very much the appearance of a secondary trap overlying transition limestone. Large rhomboidal crystals of felspar were also struck from a rock in place in this pit; the whole is crowned by nine or ten feet of very stiff clay.

6th.—On the west side of Cataraqui creek, immediately opposite Brewer's upper saw mill, very fine specimens of

large hexagonal mica, of a brown colour, and aggregated into masses, are taken from a rock which, judging from a hand specimen, appears to be a genuine granite, and is probably the oldest formation which shows itself in these parts. It is possible, however, that this mica is from a granite vein, traversing a younger rock.

7th.—From a quarry situated about five miles to the south of Brewer's upper mill, near the road to Kingston, and on the east side of Cataraqui creek, the main supply of stone for building the locks at Brewer's mills is obtained. The little stripping required in quarrying this stone, is the cause of its being brought a distance of from three to five miles. It does not appear to be by any means so good a material for building as No. 1, although it is probably of the same formation—it is of a yellowish colour. It is the different state of oxidizement in the iron which is present, that occasions the difference in the colour of that sandstone; when red, the iron is in the state of the red oxide; when yellow, it is the brown oxide of iron which affords the colouring principle.

8th.—The lock pits at Kingston mills had been sunk through a rock which may be either called a sienite or greenstone; so equally are the minerals necessary to constitute those rocks, mixed up with one another. The felspar is red and sometimes, I believe, predominating, while the hornblende is dark green, and more usually prevails. I have not observed either quartz or mica in it, but I believe they sometimes occur.

9th.—Is limestone from the east side of the creek at Kingston mills. It is dark and compact. It occurs in undulated strata of various thickness. Courses of twenty-eight inches have been procured at this quarry, for the

use of the works at Kingston mills. This ridge appears to Mr. Burrows to be a continuation of the limestone quarries at Point Henry. It crosses the Montreal road, and, he thinks, extends within a short distance of the sandstone, No. 7, where it suddenly terminates.

NOTE 6.

The St. Maurice iron works are situated on the right bank of the St. Maurice river, about eight miles upwards from its mouth. They are accessible both by land and water, but more readily by the former than by the latter. A strong current, occasional shallows, and one small rapid, rendering it necessary that in ascending the river, the oars should be laid aside, and the more tedious process of poling had recourse to. The strength of the current, however, is all in favour of descending, and with proper guides, bateaux of five tons transport cast metal, &c. &c. to Three Rivers, from whence they return to the works empty, once in the course of the day. All stores, &c. required for the establishment, are transported over land from Three Rivers, a distance of eight or nine miles, upon atolerably good and level road, across a country composed of a deep ferruginous sand, bottomed on clay, and consequently presenting a barren aspect.

From this bank of sand the visitor drops suddenly upon these iron works, which consist of one smelting furnace, two forges, one charcoal mill, one saw mill, and one grist mill, with minor workshops. The whole, including the domestic establishment of the resident, and the huts of the workmen, presenting the appearance of a small village.

By damming up a small stream running into the river from the west, ample conveniences for washing the ore are obtained, and power sufficient to drive the furnace bellows, which is moved by a wheel thirty-two feet in diameter. A grist mill, a forge for drawing bar iron, with a hammer weighing five hundred weight, a mill for grinding charcoal for the moulding room, a saw mill, and another forge, having also one hammer of five hundred weight. The supply of water is constant throughout the year.

The description of ore made use of is the bog ore, which is obtained from the neighbourhood of the works, not, however in the immediate vicinity, as that, although not entirely exhausted, is said to be scattered over the ground in such small deposits as not to be worth the expense and labour of making roads to them, while ore can be procured in great abundance, in other places though at a greater distance. The nearest point from which it is brought at present is six miles, and farthest nine.

This ore is of excellent quality, and occurs in patches of different sizes, varying in thickness from six to twelve inches. It is found from four inches to one foot below the surface.

Those places which were exhausted of ore many years ago, are said to exhibit no appearance of a renewed supply. It is probable however, that those exhausted spots which have become filled subsequently with stagnant water, would, after continuing in that state for some time, afford some appearance of the kind. This species of renovation is common to bog ore, and where observed, it has been often supposed to be owing to the growth of the ore; the rationale however, appears to be this,—water combining

with the different acids and alkalis, which, decomposing animal and vegetable substances afford becomes capable of dissolving oxidulous iron, &c. When such waters become stagnant a precipitation ensues not only of those minerals, &c. which may have been held in mechanical suspension by the water, but also of most of those which are chemically combined with it. In this manner an argillaceous and phosphorized variety of iron ore is formed of a thickness proportioned to the time this reproducing power has been in action. Indicative of this natural process the interior of the cells of bog ore are sometimes lined with a blue phosphate of iron. In the south western parts of New Jersey, where bog ore occurs in great abundance, many spots previously exhausted are explored again successfully, after the lapse of about twenty years.

The iron is probably derived from the ferruginous sand banks which have been said to characterize this place, and from deposits of magnetic iron in the primary chain to the northward, the existence of which the profusion of magnetic sand which the waters of the St. Maurice throw upon its shores, renders almost certain.

It is worthy of remark that the ore is here said to be deposited on a *coarse white sand and never on clay*. The thin stratum of clay, which it would appear was necessary to retain the waters, holding the iron in solution sufficiently long in a stagnant state to allow of its precipitation, (a purpose coarse sand would scarcely answer,) has *perhaps* been converted into bog ore by a species of impregnation common to this substance, and often decidedly observed in roots of trees, &c., as it is probable that a similar formation has seldom been deposited originally on any other than a retentive sub soil.

In one instance a second layer of ore was found beneath the first, where there are alternating thin strata of clay, such an occurrence is not unlikely to exist.

As to the quantity of ore to be obtained, it is not possible without instituting an actual survey for the purpose, to obtain any other information than that of the most general description. The individuals best informed on the subject, believe it to be in considerable abundance, if not on the land leased by Government, on the adjoining seigniories of Cap de la Magdelaine, Champlain and Batiscan. The seigniory of Champlain belongs to one of the proprietors of the iron works, the Honble. Mathew Bell, but the other two either are or were the property of the Crown.—Hitherto when one deposit of bog ore has been exhausted another has been readily found by probing the ground with a short pointed piece of iron, when if ore be present it is ascertained by the gritty metallic sound returned. The nature of much of the land in these parts swampy, cold, barren and covered with soft wood, are signs of the probability of its frequent occurrence. Where hard wood prevails ore is not found; hemlock, spruce, sapin and cedar accompany it—white pine is not found in abundance where ore occurs.

The credulous workmen are said to be alarmed by the *ignis fatuus* which is sometimes seen floating over the bogs in this part of the country. The appearance of this meteor should rather be welcomed as a favorable omen than otherwise, as it certainly proves the presense of phosphoric acid, one agent, probably by which the iron ore was originally dissolved, and removed from in some cases remote situations to others, where under a new form it can be readily worked. The *ignis fatuus* is ascribed to a mixture of hydrogen

obtained from the decomposition of water with carbon and phosphorous, from animal and vegetable substances. The presence of phosphoric acid, however, does not improve the quality of the ore, as the bar iron made from it is said by writers on the subject to be often, in consequence, what is technically called "cold short," that is brittle when cold.

This ore is said to afford good pig and bar iron, the former at the rate of 45 per cent., it is probable, however, that this is rather overrated, as bog ore seldom yields more than 35 per cent. No plate iron, wire, nor steel, have been manufactured; for the two first, it may probably be too brittle owing to the presense of phosphoric acid, which is always found in metal obtained from this ore.

The articles of cast iron furnished by this establishment are stoves and hollow ware of all descriptions. The former are cast thick to resist the cold of the climate, and are found to be less liable to crack than those imported.

During the late war the lake service was supplied with trucks, shot and other castings by this establishment, and in the event of a future war, not only the marine branch of the service, but that of the ordnance also could be supplied with many articles which the nature of the service might require, such as gun carriages, shot, shells, &c. &c. the the price would of course depend upon the state of the trade.

The quantity of cast iron obtained averages about two and a quarter tons per day—the result of two drawings in twenty-four hours, or sixteen tons per week. From forty-five to fifty hundred weight of bar iron is manufactured each week for the supply of axes, horse shoes, ploughshares, &c. &c.

The growth of timber is, in the swamps, spruce, hemlock,

tamarac, cedar, sapin, (the pine which yields the Canada balsam.) On the higher elevations birch, maple and beech. The quantity is thought not to be sufficient for the smelting of all the ore. That prefered for making charcoal is beech, birch and maple. The proportion of coal to ore is six hundred and forty-eight bushels to three tons. The charcoal is made in winter and brought to the works a distance of from four to seven miles.

Some years ago a very fatal accident very nearly happened at these works. The first layer of coal had just been put upon the furnace and lighted, when one of the men seeing scoria sticking to the sides of the furnace, descended to remove it, and while standing on a ladder to do so he suddenly lost his senses and fell. Another man seeing the transaction descended likewise, and while putting a rope round the body of his inanimate comrade, a stupor came over him and he fell also. A third man now descended with a rope round his body and succeeded in getting one of the men out, but not before the gas had taken effect on himself as he was drawn out apparently lifeless. The man who first fell was the last who was taken out, yet he suffered least, and subsequently described his sensations previously to falling as very pleasurable, while those of the other two, both before and afterwards were said to be horrible. One man indeed, was very angry with the Doctor, I believe, for bringing him to life.

The river opposite the forges, as these works are called, is two hundred and eighty-eight yards wide. At the mouth of the river where the ferry is established its width is according to the ferryman about four hundred and eighty yards. This river continues navigable for six miles above the forges, but the current is in some places very rapid—

at least four miles an hour. Where the river ceases to be navigable, a fall called the Falls of the Greys, occurs and it is not far from the foot of these falls on the right bank of the river that the sandstone for building the hearths and furnace and the limestone as a flux for the ore are procured: I walked to these quarries by the shore of the river, and shall attempt to give a geological section of the country passed through.

No rock appears on the banks of the river for three or four miles; its place is supplied by a stiff clay, through sections in which streams and small torrents descend, the colour of whose waters often indicate the presence of iron in solution; it is less equivocal when, as is also often the case, a crust of the red oxide of iron is found covering the rounded stones and pebbles at the mouths of these streams. About one mile or thereabouts, from the works, a sulphuretted spring is met with, rising in the river, and forming a small *jeu d'eau* above it. The smell of sulphuretted hydrogen is so powerful that it is impossible to pass the place without noticing it. On the dry bank opposite, down which a small stream is trickling, a white curdy mineral is observed coating the sides of the bank, and evidently deposited by the water, which is also sulphuretted. It was supposed to be either a carbonate of iron, or a sulphate of lime, but no examination of it was made, to determine that question. The same appearance is observed at St. Paul's Bay, where also chalybeate waters mix with those which are sulphuretted.

The first rock which was met with, is a fetid shell limestone. Suddenly cropping out of the ground—the same as that in which the quarries are worked, and which are situated near the falls, about two hundred yards from

the river, and perhaps fifty feet above its level. The sandstone which is next met with on the shore, about one mile and a quarter below the falls, is, as I conceive, of the old red sandstone formation, although its colour is rather white than red. It forms a low bank, running parallel to the river, at the distance of about one hundred feet. It dips with the river, but faster, in consequence of which it is soon lost in that direction. Its total depth is about twenty feet, one half of which is below the surface of the ground at the base of the section, and about one-third is below that of the river. It is divided into strata, varying from a few inches to nearly two feet in thickness. The upper strata are rubbly, often friable, and of a reddish colour externally, but the lower turn out some excellent blocks, and haslars from five to six feet in length, may be obtained, although not easily. On account of the whiteness of its colour, the fineness of its texture, but above all, on account of the obstinacy with which it endures the greatest heat of the furnace, this stone has acquired a kind of notoriety, and in consequence, I was sent a few years ago, by order of His Excellency Lord Dalhousie, to report upon it, with the view, that if found to be of a favourable description for building, permission might be obtained from the proprietor to remove a sufficient quantity of it to erect a monument to Wolfe and Montcalm, a work at that time in contemplation. The report was unfavourable, partly on account of the expense of quarrying the good material, but more because the best of it was not considered by any means so well calculated to resist the disintegrating action of the atmosphere, as the stone (a grey wacke from Cap Rouge) of which the monument was ultimately built. It does not follow, because a stone stands the furnace well, that it should

resist the weather equally well, or *vice versa*, as there is a great difference in the *modus operandi* of these different causes. Much depends upon the nature, particularly as regards the structure of the stones, for instance, compact stones usually resist the weather well, but will fly immediately in the fire as flint, quartz rock, &c. On the contrary, rocks and stones of a granular and slaty structure will often crumble away in the air, but which would resist heat remarkably well. But it is ridiculous to dwell upon so obvious a truth, which would not have been done if an opinion were not prevalent that any stone which will endure heat, will also endure what is so very different, the capricious changes of the atmosphere at all times,—the combined action of heat and moisture, in the summer, and the still more powerful combination of cold and moisture in the winter.

In corroboration of what I have been saying, the sandstone in question is by no means extraordinary as a building stone, but for the particular purposes of constructing the furnaces and hearths stone, it is not easy to conceive a better material. Upon examining the sandstone with a microscope, it appears to be composed of grey grains of quartz, and a somewhat powdery mineral of a white colour, which appears to be decomposed felspar. All parts of it are infusible under the blow-pipe.

Above this sandstone lies in conformable, that is parallel order, and close contact, a dark grey wacke, averaging twelve feet in thickness, immediately above which rises, at an angle of about 45° to the height of nearly one hundred feet, a mass of sandy alluvium. There is not the least doubt that the limestone before mentioned overlies the grey wacke; but whether other intervening strata may not occur is a question I cannot decide.

About one mile and a half higher up the river, and about one quarter of a mile above the falls, another section of this sandstone is seen,—here the French formerly quarried. From the circumstance of the strata of sandstone in the first quarry dipping, as has been described, faster than the river, I was induced to think that this section would be deeper than the other, and upon proceeding to the spot, this was found to be the case. The sandstone here forms a bank about twenty feet high, and its summit is perhaps fifty feet above the river; immediately at its base, a coarse conglomerate, composed of large rounded pebbles of quartz in a paste, apparently of indurated clay, was noticed. I was not able to ascertain what rock holds its position between this conglomerate and the sienitic rock below, which forms the falls of the greys, and much of the shore at its foot; but I think it is a recurrence of the same sandstone. An interesting geological fact was noticed here, similar to what has been observed in other places in Canada, viz. that the primary rock beneath appears to have thrown up the sandstone, and occasioned an opposite dip; thus the sandstone below the falls dips down the river, while that above is inclined the other way.

The profusion of magnetic sand on the shores of this river in this place has been already mentioned, as well as the cementing power it exerts.

The sand, or rather loam, which is used in the "moulding room" for the finer impressions, is procured from England, as it is said that an article proper for the purpose has not been met with in the country; they, however, both at Marmora and Kingston use a sand for casting stove plates, procured in the neighbourhood of those places. Sand of the best description must be of rare occurrence, as we are

told that there are only three places in England, in which it has been found, viz. Highgate, Woolwich and Liverpool, from the last of which places it is obtained for the moulding rooms in Scotland.

The following characters appear to be necessary to constitute a good moulding sand, viz :—

1st.—Great fineness in the particles.

2d.—A freedom from any which soil the fingers.

3d.—Infusibility and incombustibility at the temperature of melted iron.

4th.—Sufficient adhesiveness to prevent the liquid iron from washing any of the particles away.

5th.—Porosity to allow the escape of the gas, (hydrogen,) which is generated when the fused metal decomposes the slight degree of moisture necessarily present in the sand, and which gas is observed to burn away with a blue flame on the surface of the mould. A mixture of silex and alumine, the former predominating, and both in a state of considerable fineness, would afford an article which, judging *a priori*, would be likely to answer. The presense of the red or yellow oxide of iron in an ochrey state would not probably injure its qualities, but all sand containing carbonate of lime or vegetable substances should be rejected, as the former, when in contact with the liquid metal, would act as a flux upon the other minerals, while the latter would burn away, leaving vacuities, both of which circumstances would injure the impression ; much of this, it must be confessed, is conjecture, unsupported by any experiment with which I am acquainted.

At Three Rivers there is a small establishment for recasting old iron and pigs brought from the forges of St. Maurice, which the occurrence of the Sabbath prevented

from being cast in moulds. It consists of two cupola furnaces. The mixture of the old and new iron is found to improve the quality of the recast metal. Here, besides sugar and pot ash kettles, &c. &c. iron gear for steam boats is manufactured.

The establishment at St. Maurice was commenced by the French Government about the year 1737, and a foundary for cannon is said to have had existed here, but no vestiges of any operations of the latter description remain.

I will close this report with a short account of the Batiscan works, &c.

The river Batiscan enters the St. Lawrence from the northward about twenty miles below Three Rivers. It is navigable in the spring for schooners, at other times for boats, nine miles above its mouth, where are the ruins of an iron foundary established there about the year 1798.

This establishment consisted of a blast and air furnace, two forges, a saw and grist mill, besides other necessary work shops and dwelling houses. Both ore and wood are to be procured here more readily than at the forges of St. Maurice.

The cause of its failure appears to have been the want of capital and good management.

The land either is or was, until very lately, the property of the Crown.

For most of the information, which is matter of fact contained in this note, I am indebted to Mr. Greaves and to Mr. M'Cauley, who through the politeness of Mr. Bell, had been requested to afford me all the information I might require, which they readily did in the kindest manner when I visited the St. Maurice works.

NOTE 7.

This mineral is turned up by the plough, and is found in the water courses of a field, (composed of a stiff clay,) in rear of Dr. Mill's house at Sillery, in the neighbourhood of Quebec.

It occurs under all of the following forms, botryoidal, reniform and mamillary, and varies from the size of a nut to that of a large potatoe. These are incrusted on the outside by a yellowish white coating. Internally it is bluish black, though not uniformly so exhibiting when broken red and yellow parts. Its structure is earthy and it is extremely friable—very adhesive to the tongue and gives out a strong argillaceous odour. Its specific gravity is low, but it absorbs water so rapidly and abundantly, as to hiss, bubble and have its weight considerably increased after a short immersion; it does not, however, fall to pieces in water. It yields to the nail and receives a polish from it. It is not magnetic until exposed to a read heat with grease, and then only slightly. Before the blow-pipe it becomes glazed and rounded. *With borax it forms a glass globule of the colour of the amethyst,* but the greater part of the essay remains suspended in the flux. If too much heat be applied, or if continued long, the colour of the globule is yellow, afterwards it becomes colourless.

I may be mistaken in calling this "wad" but it is certainly a combination of manganese and iron.

NOTE 8.

Talc and mica, (the silver varieties,) have often been mistaken for silver. Some years ago, I was invited by the

Honble. Judge Taschereau, to visit his seigniory of St. Mary's, L. C. At that period it was reported that one of his tenants had deserted his family and home, and had taken up his residence in the woods, where he was working by his own solitary manual labour, which he conceived to be a silver mine. We visited the scene of his operations and found an excavation about ten feet every way in—talcose schist. A letter was written to the Priest of the parish to endeavour to withdraw the poor enthusiast from so ruinous an occupation.

NOTE 9.

The reader has been referred to Silliman's Journal, for information respecting the gold mines in North Carolina. It is proposed here to give two extracts from other sources on the same subject.

"The extent and value of the gold mines are becoming every day more apparent,—of course some mines are larger than others. The one at Chisholm's has been found to be rich for a quarter of a mile up the branch (of the Yadkin river?) and on each side from ten to twenty yards. There are many spots of from ten, twenty, to one hundred acres, on which gold can be found, averaging from half a grain to two grains of gold per bushel of earth. In most of these cases it is not gold but water that is scarce. Gold has been found in the neighbourhood of Charlotte; those mines are rich, but their extent is not yet known. The gold found there is in very fine particles, embedded in ferruginous clay, running in veins. This is taken out, made fine, then washed down, and the gold amalgamated. Chisholm's gold mine is situated two miles above the narrows of the

Yadkin river, on Beaver-dam creek, almost one mile from its mouth. It is on this side we are erecting our steam engines. If the machinery for working answers, we cannot fail to do a good business. The gold is there—all that we want in order to obtain it is labour-saving machinery." —*New York Commercial Advertiser.*

" In the United States—in North Carolina, in Cabarras county, on Meadow creek, &c. the gold occurs in grains or small masses in alluvial earths, and chiefly in the gravelly beds of brooks in the dry season.—(GIBBS.) According to Mr. Ayres, one mass weighing twenty-eight pounds has been discovered. The gold of Cabarras is alloyed with silver, and a little copper. When purest it is twenty-three carats fine, and is superior in quality to the gold coins of England and the United States. In 1810, upwards of one thousand three hundred and forty-one ounces of this gold, equal in value to twenty-four thousand six hundred and eighty-nine dollars, had been received at the mint of the United states.(Bruce's Min Jour. vol. 1.) It is said also to have been found on the upper branches of James' river, and on the Catabaw, in South Carolina.

" It appears that most of the gold of commerce is obtained from auriferous sands. When thus found, it is extracted by the simple process of washing the sand. When enveloped in other minerals, it is extracted by amalgamation with Mercury."—CLEAVELAND.

The geological associations and position of the gold of the Carolinas, has become a subject of controversy in Silliman's Journal. The competitors are the Professors Olmsted, Mitchell, Eaton, and Mr. Rothe.

Professor Olmsted considers the gold to occur entirely in a deluvial formation.

Professor Mitchell considers it to occur as follows:—

1st.—In veins of quartz, traversing the ancient primitive rocks, in very small quantity.

2nd—In veins of quartz, traversing more recent primitive rocks, in considerable quantity.

3d.—In veins of quartz, traversing transition rocks, and also disseminated in considerable quantity.

4th.—In soil produced by the decomposition of these three kinds of rocks.

5th.—In the sand of a stream running over old red limestone, in very minute quantity.

Professor Mitchell is therefore of opinion that the gold is found almost entirely *in situ*.

Professor Eaton appears to be of the same opinion, and further that it occurs in quartz veins traversing talcose schist; whereas Mitchell considers the rocky matrix to be an argillate.*

Mr. Roothe is of opinion that the gold occurs both *in situ* and alluvium—in the first instance in quartz veins traversing secondary greenstone and greenstone slate.

The papers containing this controversy are to be found in the 9th, 13th, 16th and 18th vol. of Silliman's Journal.

NOTE 10.

"There is a rich lead mine in the township of Potton, adjoining the boundary line between Canada and Vermont. In early times the Indians are reported to have got loose masses of this lead. It is situated at the base of a bold

* Such was formerly Professor Olmsted's opinion.

conical mountain plainly visible from Lake Memphremagog. On the top of the mountain which is small but flat there is a pond from fifteen to twenty rods in diameter.

In the neighbourhood there is a hill with a precipitous descent, from the summit of which a column of dense smoke is frequently seen to issue, about one foot in diameter.—One man got a few years ago, between thirty and forty pounds of pure lead, (sulphuret of lead,) in one morning from the mine described."—WILCOX.

"On an estate belonging to the Seminary of Quebec in the Bay of St. Paul, a lead mine was discovered some years ago. The veins which have been traced are slight, but two Germans who were brought over to the country on account of like discoveries in the upper country, examined this and thought it worth the working."—Gen. MURRAY's Report.

I have seen this lead; it is an argentiferous galena, I believe, and occurs in veins traversing a white marble, associated with chlorophane of a beautiful green colour. Large masses of this marble detached, but of an angular form, are found lying at the foot of the primary range, on the right bank of the Gouffre river at St. Paul's Bay.—These masses leave specks of galena disseminated in small quantity, and are traversed by hair veins of the same. The chlorophane appears to be embedded in the marble in large distinct masses. We ascended the hill in search of the vein or bed, but found nothing but bare and whitened surfaces of primary rocks.—(See page 82, 2d vol. of the Society's Transactions.)

NOTE 11.

Mineralogical characters of the sulphuret of zinc found in the transition limestone of Kingston.

Two varieties are found, the yellow, the lustre of which is resinous and the lead coloured, which bears a resemblance to galena. The structure of the latter to which, I at present confine myself, is perfectly laminar, and the faces of the laminæ exhibit the splendent metallic lustre, which, however, although it does not entirely vanish on being scraped, is then only glimmering metallic. It is brittle and easily scraped by the knife, and the powder thus obtained is of a light grey colour. Its spacific gravity 4-1. In the mattrass it decrepitates violently. In the interior flame of the blow-pipe it becomes first yellowish and by continuing the heat blackish, during which period a sulphurous odour is exhaled, and a powder of a lemon colour, (sulphur,) is deposited upon the charcoal. But its most distinguishing character is the unpleasant smell of sulphuretted hydrogen which it exhates when its powder is digested in acid.

NOTE 12.

"I have found a black and garnet coloured sand in great abundance on the shores of the Lakes Erie and Michigan. This is a sulphuret of mercury, and yields about 60 per cent. It is so easy to be obtained and in so convenient a form for distillation, that it must become an important article of commerce."—STICKNEY in Silliman's Journal, vol. 1.

Garnet coloured sands are very common in Canada, but they are composed of a mixture of maxnetic iron and garnet.

NOTE 13.

If the townships and allotments of land in these Provinces have been laid down by compass, they cannot possibly be correct, for with all the care an experienced surveyor could bestow, he would not have been able to make the proper allowance for the degree of *local* magnetic attraction, the comparative intensity of which, at different places is so various and uncertain. We shall be told that the surveyor, in running an allotment or township, first commenced his operations from some plain or bank of a river, far removed from hills or mountains, (the more frequent depository of magnetic iron,) and out of the reach of local magnetic influence; and that having there laid down a magnetic meridian he no longer used the compass, but produced his lines by covering vertical pickets.

This method is perhaps the best that can be adopted in the absence of all instruments except the compass, but after all it is very liable to error, for, not to mention the impossibility of always finding a spot free from mountain or hill, if a plain or bank of a river so situated, be found, who can be sure that local magnetic attraction does not extend to it; who can be sure that it is not itself the seat of that attraction—may not the very sand at your feet or the boulders on which you are seated be magnetic.

Where primary rocks occur in this country, the presense of magnetic iron may be suspected. Some of the secondary trap division are also magnetic. But local attraction is sometimes so little indicated by external appearances that the most experienced may be deceived. Mr. Watts of Cape Diamond, and Mr. Saxe of the Surveyor General's Department of Lower Canada, both agree in stating that the neighbourhood of L'Acadie is remarkable for the local

magnetic attraction which exists there. I believe no geologist would suspect its operation upon passing his eye over the country. As far as I am acquainted with it, the soil is alluvial, with a topping of vegetable earth and no rocks or mountains near enough to effect the compass in so remarkable a manner. The following quotation from Guillemard is descriptive of the soil in this portion of the Province: "La rivière Sorel après avoir quittè le bassin de Chambly, mouille le pied d'une montagne appellée Belœil. Entre cette rivière et le fleuve St. Laurent, est une plaine immense, sur cette plaine entirement uni, il ne se trouve point de roche et presqu'aucune pierre. En creusant on trouve jusqu'a une profondeur considerable, des sol des differentes espèces, du sable, de l'argille, de la terre bégélale, et dans beaucoup d'endroits, une mitre matière bégélal noir, ressemblant beaucoup à une espéce de tourbe appellée peat," he adds the summit of the Belœil mountain is a deep grey and large grained granite; it contains little mica, but a considerable quantity of black schorl; the sides of the summit are principally composed of a greyish black schistus, very compact, some parts of which resemble basalt in form and grain. In descending the Sorel, rocks are no where seen, at Sorel the banks are of a fine clay, full of mica.

Is it not possible that M. Guillemard may have mistaken that for granite, which is a trap rock of the same age and character as the Montreal mountain? Black crystallized hornblende often much resembles black schorl; basaltic hornblende is associated with the former in the Montreal mountain. I have hazarded this conjecture without having seen either a specimen of the Belœil mountain, or any other account of it than M. Guillemard's, because if correct, it

renders more probable the following explanation of the cause of the magnetic attraction in the neighbourhood of L'Acadie, viz. that it is owing to the reappearance of the same trap on the surface of the ground which, as in the instance of the Montreal mountain, is known to be very magnetic.

This mountain has a remarkable action upon the magnetic needle. While surveying on its summit some years ago, I observed a variation of 4° in a distance of one hundred and seventy feet. At first some error was suspected in the operation, but by frequent trials and with different instruments, the existence of this phenomenon was placed beyond all doubt.

It was a somewhat singular coincidence, that while employed ascertaining the fact, Mr. Shand, the overseer of works in the Engineer Department, who had been employed running a line by compass on a another part of the mountain, joined me to report a much greater deviation of the compass in his case than in mine, we were afterwards obliged to work without any reference to a compass, which is unquestionably the best plan at all times.

Lieut. Luxmoore, R. E. while measuring a base on the ice opposite Montreal, a few winters ago, found a variation of 1° in about two thousand five hundred yards, probably the effect of the same cause, though weakened by distance.

It is the character of the trap rocks, like the Montreal mountain, to effect the compass. The basaltic range in Ireland, called the "Giant's Causeway," does so in a remarkable degree. This phenomenon is not owing to these rocks containing beds or veins of magnetic iron, but to the iron entering into the composition of the rock, being magnetic; and as those rocks in many cases are decidedly

secondary or overlying their supposed igneous origin, appears to receive additional support from the fact, that magnetic iron, a mineral so rare among the secondary class in general should even be characteristic of the trap species, and which the purifying nature of the heat these rocks are supposed to have been subjected to, may account for.

The neighbourhood of Kingston is remarkable for local attraction, but I believe it is principally confined to the Point Henry side of the river, where the occurrence of amphibolic rocks may occasion it. Mr. M'Donald, in running the boundary line of the military reserve experienced it frequently. Lieutenant Wulf, R.E. noticed a variation of 10° in a distance of about six hundred feet; and Mr. Markland, in a general report on Kingston, writes—"No mines have as yet been discovered but from the difficulties which surveyors have met with, in running parallel lines, owing to the variations of the needle, there can be no doubt of the existence of iron mines."

An opinion is too generally entertained that in places where the compass is locally effected, mines of iron may be expected to occur, and that where no such phenomenon exhibits itself, it is useless to seek iron ore. In by far the generality of instances, in which the needle indicates the vicinity of some magnetic body, that body will be found to be a barren rock, containing iron it is true, but in an unavailing quantity, disseminated through the rock in small particles; to obtain which, in a state of pure iron, the rock itself must be smelted. In the generality of instances also, in which mines occur, they exercise no influence upon the compass whatever.

Among the many species of iron ore, there are only two,

or at most three, which would be likely to move the needle upon approaching it. One of these enters as a constituent among many rocks, particularly those of a dark green colour, or those of a black which are not limestone. It also much more rarely forms solid beds of magnetic ore, such as have been described in this essay. To the former cause I attribute the local attraction near Kingston, in the neighbourhood of which place many rocks occur, both fixed and detached, which would be liable to attract the needle.

Whatever may be the cause, however, of attraction in any particular case, all authorities agree in stating that local attraction is very common in Canada; and this fact should be particularly borne in remembrance by those who use the compass, either for surveying or for the more general purpose of security in the woods. It shews that too much confidence may be placed in this instrument, and that an implicit reliance upon it for security, while traversing the forest in this country, might prove the destruction of the traveller.

Besides a natural local attraction, or a local attraction resulting from natural causes, instruments are sometimes liable to a similar influence from artificial ones, as appears from Mr. Amos Eaton's observations in Silliman's Journal for March, 1827, p. 14. With the aid of a microscope, he detected very minute steel scales attached to the limbs of the instrument, and left there in the manufacture of it.

The theodolite and the sextant are the only instruments which should be used by surveyors in this country, without any reference to the compass of the former, but starting from a *true* meridian.

NOTE 14.

In several places along the northern shore of the St. Lawrence, below Mal Bay, veins of magnetic iron are found in the rocks, and they are said in consequence, to exert an influence upon the ship's compass, in passing up and down the river. Captain Bayfield, however, never noticed any thing of the sort, but attributes the observed difference in the compasses of vessels from the bearings laid down in correct charts, to the *local attraction* of the vessels themselves. This local attraction, which varies in different vessels according to the quantity and distribution of iron in the construction, equipment, and cargo of the vessel, and also according to the situation in which the compass is placed with respect to the focus of attraction, is called the *deviation*. The deviation has but lately been taken into account, and allowed for in His Majesty's ships, and is in general entirely overlooked in merchant vessels. The error, from this cause, in those latitudes frequently exceeds a point of the compass.

NOTE 15.

A Mr. Mason appears to have examined the country in the neighbourhood of Charlotteville with a view to ascertain the quantity of bog ore in it. He says—"The bog ore is scattered over the whole of the country; but I do not know any one bed of ore that will exceed one hundred and twenty-six tons. I spent three months in examining the country for ore, and I calculate that it will take all the ore I found within twenty miles of this place, to supply a small furnace for seven years; but I believe considerable

quantities, within that space, are not yet found. No rock ore has yet been found in this part of the province." And Mr. M. thinks it not likely that there will be.—(See additional note commencing in the next page.)

NOTE 16.

In the township of Yonge, some years ago, an explosion took place in a vein of iron pyrites, of which the following is an account, from the pen of Dr. Bigsby:—

"This explosion took place sixteen years ago (1809) in the township of Yonge, near the Lake of a Thousand Islands, in the St. Lawrence. At the time, a man was seeking his cow in the woods, within a short distance of the spot. On a sudden he was startled by a tremendous explosion, attended by volumes of smoke and sulphurous odours.—Three years since, upon being informed of these particulars, I visited the place. It is half a mile within the woods, north of the road from Brockville to Kingston, near the easternmost of two creeks, and about ten miles from Brockville. I found on the summit of a quartzose mound from thirty to forty feet high, a round cavity twelve feet deep, twelve feet long, and nine feet broad. Its sides consisted of very shattered quartz, spotted brown by oxide of iron, and covered profusely with acicular yellow and white crystals of sulphur. The lower parts of the cavity were studded with masses of iron pyrites, of which there is a vein at the bottom of the cavity. It is a foot and a half thick, and disseminates itself into the surrounding quartz. This vein may be seen running east, with a very high dip, to the distance of a yard and a half."

Similar phenomena have been noticed in a mountain in Vermont.—(See Silliman's Journal for February, 1821.)

Also in the country towards the head of the Missouri.—(See Travels of Captains Lewis and Clarke.—Geological Transactions.)

It is remarkable that pseudo volcanic substances, such as pseudo volcanic carbonate of iron, pseudo volcanic quartz, formerly having cubic pyrites disseminated throughout, the impressions of which still remain, are said to occur in the township of Yonge.

The following additional note, giving an account of the iron works on Lake Erie, has been drawn up by my friend Captain BAYFIELD, R. N. who, in my absence from Quebec, has kindly superintended the printing of my paper.

ADDITIONAL NOTE.

The substance of the following information respecting the iron works in the London District of Upper Canada has been communicated by Mr. J. Harris, R. N., a corresponding member of the Literary and Historical Society, who resides on the shores of Lake Erie near the principal known deposits of the iron ore which is the subject of this note.

The locality of this ore has not, to my knowledge, been visited by any person possessing the geological and mineralogical knowledge which would be requisite to enable any one to give a complete account of the nature, situation, and associations of these deposits of bog ore, or a mineralogical description, founded on analysis, from which might be inferred its value, either in regard to its productiveness of metal or the more or less facility with which it might be reduced.

In the absence of a more perfect account, the following, which I have drawn from the information furnished by my

friend Mr. Harris, may not be deemed altogether uninteresting, particularly as I believe, that it is the first notice which has been taken of deposits of ore, which from their advantageous situation, on the immediate shore of Lake Erie, may hereafter prove of much importance.

The first attempt to establish iron works for the purpose of working this bog iron ore was made at the mouth of Potter's Creek, a small river which enters the bay of Long Point, in the township of Charlotteville, London District, Upper Canada. Mr. John Mason, an Englishman, had the merit of this first attempt. In the year 1817, he erected a blast furnace, of a rude and primitive description, entirely by the labour of his own hands, with the exception of the machinery for the blast. The bellows were formed out of two hollow white-wood trees. It is thus that the spirit of enterprise and necessity, which has so truly been called the mother of invention, enables an individual, in this young country, to overcome difficulties, which in other situations would be considered insurmountable. Mr. Mason, however, did not live to complete his undertaking—he died, after setting an useful example and collecting a few tons of ore.

In the year 1820, six young and enterprising Americans came to the country, and under the firm of Capron & Co. purchased the place from Mr. Mason's widow :—proceeding in their labours with united perseverance and industry they soon had a furnace in operation. They commenced by casting stoves, hollow ware, and other small articles :—also some potash kettles and mill castings, but are said to have generally failed in producing good work.

Their machinery for producing the blast was very defective, and they also found their works to be too con-

tracted to supply the great and growing demand for their manufactures.

In 1830 the establishment was burnt by accident, but was rebuilt almost immediately upon an extended scale capable of doing more than double the work of the former. In August, 1830, these works were again in full operation under the firm of Messrs. Joseph and Benjamen Vannorman. Mr. J. Vannorman by a simple and ingenious contrivance has much improved the machinery of the blast, which now consists of an overshot wheel, moving two pistons by a single crank—the pistons being at right angles to each other. But still this improvement does not, it is said, produce that regularity of blast which is requisite to extract all the metal and turn out good work, So sensible are they of this defect, that they save the slag to remelt, although they have not yet done so, and probably will not, unless the ore beds in the vicinity should fail, a circumstance which is not likely to occur for some years, although Mr. Harris says he is far from considering them as inexhaustible.

Mr. J. Vannorman has so improved these works, that besides the articles previously mentioned, he has lately succeeded in making some excellent mill castings of large dimentions.

Besides the furnace which I have mentioned, the same firm has a forge in Woodhouse for making bar iron—not of a very good quality. Mr. Harris writes thus: "the best character I can give it is, an inferior *cold short*, but I consider this inferiority to arise in great measure from the defective mode of reducing the ore. The bar is not made from pig iron, but from the ore, which is neither washed or roasted, consequently good iron can hardly be expected.

There are two other forges, one in Woodhouse, the other in Dereham, the latter is not doing much."

The ore which is used at these works, is bog iron ore, said to be of a superior quality. It is found in the swamps of Charlotteville, Middleton, and Windham. Houghton, Norwich, Dereham, and other parts of the London District of Upper Canada contain ore also, but these deposits have not been worked. No rock iron ore is known to exist in this part of the country, but the deposits of bog iron ore are said to be derived from water, which oosing from the soil remains stagnant in the swamps depositing the bog iron therein. Mr. Harris is of opinion that the clearing of the country from wood will be likely to check the accumulation of the ore.

The soil contains a very considerable quantity of magnetic iron, disseminated in grains. Mr. Harris has extracted (he does not say by what means, but I suppose by a magnet,) thirty or forty grains of ore from one pound of the soil, in Charlotteville, previously dried. The whole district is said to contain more or less of ore, particularly the sandy parts.

Those beds that have been worked have yielded from thirty to thirty-three per cent. of very soft iron. It may be presumed that they do not obtain all the metal, as they neither wash or roast the ore to rid it of its impurities.—They do not use any flux, it is probable therefore, that the particles of soil brought in with, and adhering to the ore, renders any other flux in some measure unnecessary.—Much metal is said to be lost by its entering into combination with the silecious and other impurities thus placed with it in the furnace. The furnace produces from eighteen to twenty tons of iron per week.

They at first tried the fire-stone from Dumfries, but it failed, so far, that it would only answer for lining. They now obtain their fire-stone from the State of Ohio, of a good quality.

Moulding sand is obtained on the site of the furnace, and it is considered good by several English moulders.

Secondary limestone abounds in the neighbourhood containing organic remains, and burning easily into excellent lime. Fetid limestone is also met with. These limestones, I am inclined to believe, support the beds of sand, clay, and boulders, in which the iron is disseminated, from which the bog iron ore is derived.

Mr. Harris says, that boulders abound all over the London District, but that primary rocks have not been observed in *situ*.

Timber for charcoal is abundant and in great variety—the hard maple is preferred.

With respect to water, they have great advantages.—Potter's Creek, although not a large, is a never-failing stream. The works are situated at its entrance, immediately on the shore of Lake Erie. Hence the great convenience of sending off their weighty manufactured articles, or of receiving any supplies which they may require, without the expense of land carriage.

Mr. Harris closes his information by the following facts, which may be interesting to future travellers.—"There is a petroleum spring at Lobo, on the river Thames; and there is a remarkable spring, in my creek, in Charlotteville, near where I reside. I have frequently smelt the vapours from this spring, at the distance of full half a mile; it deposits sulphur on the leaves, sticks, and stones, in the stream."

Information received by the Literary and Historical Society, during the last year, on the localities of MINERALS, MINERAL WATERS, *and other miscellaneous matters.*

Copy of a letter addressed by the late Quetton St. George, Esq. of York in Upper Canada, to William Stanton, Esq. and communicated to the Society, together with the piece of virgin copper therein mentioned, on 27th December, 1830, by the Hon. John Hale.

York, 10*me. Juillet*, 1806.

Monsieur,—Je vous envoye un morceau de cuivre vierge que je viens d'acheter d'un Sauvage. Je lui ai demandé d'où il l'avoit eu; il m'a répondu qu'il l'apportoit de bien loin: comme je n'entends pas bien le mississagué, il me seroit impossible de dire au sûr de quel endroit; mais autant que j'ai pu l'entendre, je crois que c'est au nord ouest de cette Ville, à deux cent milles plus ou moins, car il dit qu'il y a deux jours de marche d'ici à l'endroit ou la mine est. L'on dit qu'il y a un lac derrière la Rivière du 16, le Sauvage dit que c'est bien au de là de cet endroit, ce qui me fait croire que c'est dans le 44me. dégré de latitude ou au commencement du 45me. Je dois vous dire aussi que le

Sauvage dit qu'il y a une grande quantité à l'endroit ou il a eu celui-ci.

Je suis fâché mon cher Monsieur, de ne pas pouvoir vous donner d'autres enseignements à ce sujet.

J'ai l'honneur d'être, &c.

QUETTON ST. GEORGE.

William Stanton, Ecuier.

NOTE.—The specimen sent is about two ounces in weight, and has been hammered flat, as if in the intention of putting it to some useful or ornamental purpose. It has the appearance of being virgin copper.

Extract from a letter received from the Rev. Joseph M. Bellenger, dated St. Paschal de Kamouraska, 31st May, 1831.

Monsieur,—J'ai l'honneur de vous adresser différentes terres ou *ocres*, assez communes à St. Paschal, surtout sur la terre d'un nommé Modeste Fréchette. Il y a sept paquets, qui pourroient, je pense, être reduits à trois.

1o. terre rouge, ou ocre rougeâtre.

2o. terre, ou ocre jaunâtre.

3o. terre noire, propre à peinturer.

Sur la terre d'un nommé Charles Pelletier, on trouve trois buttes, qui depuis environ trente ans, s'élevent hors de terre annuellement. J'envois des échantillns de ces substances, qui me paroissent du charbon de terre (Houille) pétrifié ou minéralisé.

La grotte de St. Paul de la Valtrie, dont j'ai parlé, il y a quelques années sur les papiers publics, abonde en stalactiques de figures très variées, et mérite l'attention des naturalistes.

Un No. du Mercury du mois de Mai, mentionne une tête de flèche indienne, (*Indian arrowhead.*) présentée par F. Belanger Ecuier, trouvée dans le chemin de la Valtrie. Mr. Jos. M. Bellenger, Curé, a envoyé une tête de flèche Indienne trouvée dans un champ de patates, près de l'Eglise de St. Paul, de la Valtrie, la chose en elle même est de bien peu de conséquence, si ce n'est que cette flèche fut trouvée près de deux pieds sous terre.

Monsieur, Votre trés-humble serviteur,
Jos. M. Bellenger, Ptre.

Extract of a letter from John D. M'Connell, Esq. Collector of Customs at Gaspé.

Fort Ramsay House, Gaspé, 8th Oct. 1830.

Sir,—This will be handed you by Mr. Benjamin Patterson, who takes with him a bottle of mineral water for the purpose of being analyzed, the produce of a spring in the vicinity of Gaspé Basin; he, as well as the neighboring inhabitants being desirous of ascertaining its medicinal qualities. I think it a very strong chalybeate.

The Indians have also discovered an extensive spring here, which emits a liquid bitumen, possessing all the qualities of the Barbadoes tar; it is my intention to forward a sample at early convenience.

I have the honour to be, Sir, &c.
John D. M'Connell.

Jonathan Wurtele, Esq., Quebec.

Note.—The bottle of mineral water did not come to hand.

Extract of a letter from Dr. Dorwin.

Machiche, 30th Oct. 1830.

Dear Sir.—The mineral spring respecting which you are desirous to obtain information is situated in the township of Fredericton, three leagues from Machiche Church, on the bank of the Machiche river, about ten rods from the waters edge. It issues from the earth like boiling water, at the rate of about three or four quarts in a minute, attended by a crackling noise near the surface of the water, caused by the escape of a gas. The result of observations made in a hasty manner, and without any great attention to accuracy, lead me to conclude that the water holds in solution several salts: muriate of soda exists in great abundance and its taste predominates when drank. Carbonate of iron is another ingredient, as is also carbonate of lime in considerable quantity, being found deposited as tufa in the bottom of the fountain. The carbonates of magnesia and of soda are also found in the water. The gas evolved is a compound of carbonic acid and carburetted hydrogen, on the last of which depends its inflammability. Its effects when taken are much the same as those of the Saratoga waters, viz., cathartic, diuretic, sudorific, and tonic. It is the coldest mineral spring recorded. Fahrenheits thermometer when immersed in it shewing a heat of 45° only.

Mineral springs possessing nearly the same properties as the one now described are found at intervals of some miles between this place and the village of L'Assomption.

I have the honour to be, &c.

Lewis Dorwin.

J. Morrin, Esq.

Extract of a letter from the Rev. John Jackson.

William Henry, 4th December, 1830.

Sir,—It may be interesting to the Society to be informed of the existence of certain saline springs in the neighbourhood of Varennes; from which, tradition says, salt used to be manufactured in the times of the French. That may well have been the case, for the supply of fluid afforded by them is very abundant, as I myself witnessed when on going up to Montreal some years ago, I visited the place. They are situated about midway between the post road and the St. Lawrence, on a flat piece of pasture ground, and issue up through several outlets from what I would call a common reservoir, covered with a thin crust of turf; the ground sinking here to the pressure of the foot; but all around, beyond their immediate locality it is perfectly dry and firm.

The impression left on my mind is, that the water is of a milky hue and somewhat of the like consistency.

I remain dear Sir, &c.

JOHN JACKSON.

Jonathan Wurtele, Esq.
Corresponding Secy. L. & H. S.

Information received from the Honble. Mr. Justice Taschereau, respecting a locality of slate.

Québec, 3e. Janvier, 1831.

Cher Monsieur,—Je viens d'arriver de la compagne, d'où j'ai apporté plusieurs morceaux d'ardoise que vous m'aviez demandés: il y en a de plusieurs espèces, rouge, noire et

bleue ; toutes de la Paroisse Ste. Césaire en ma Seigneurie Jolliet. Il n'a pas été facile d'en avoir à présent parce que la terre est trop gelée et couverte de neige : mais le printems prochain je vous en procurerai de plus beaux morceaux.

Je suis très-parfaitement, &c.

J. T. TASCHEREAU.

L'Honorable J. Sewell Ecuier,
Juge en chef &c.

NOTE.—The specimens of slate sent resemble the Welsh slate, and seem equally fit for the purpose of roofing.

The Society has much satisfaction in being able to announce the existence of steatite, in quantities apparently inexhaustible; in the township of Broughton, a few miles south of Quebec: for this information accompanied, by a sample, the Society is indebted to William Hall, Esq. of that place.

LIST OF

DONATIONS

TO THE

LIBRARY AND MUSEUM,

SINCE JUNE 4, 1829.

J. Fraser, Esquire.—Roman Vase from Herculaneum.

Mr. W. Millar.—A Craniological Skull with an explanatory pamphlet.

Revd. G. Bourne.—A German Atlas by Homana, 1789. A variety of Geological specimens.

Dr. Carter.—An antique Roman Coin found near Knaresborough about a century ago. An Anatomical variety from a Cows throat.

Sir John Caldwell.—A basket of Insects. Specimens of Fossil remains discovered at the Hog's Back, on the Ottawa.

Peter Sheppard, Esq.—Specimen of Lead in natural state from Indian Cove near Grand Greve, Bay of Gaspé.

Captain Stanworth, of the General Wolfe.—A Tropical Sea Bird caught on the Equator with a flying fish in its mouth, on the passage from Buenos Ayres to Bristol.

S. Robertson, Esq.—A cask of Geological specimens from Great Mecatma, Labrador.

Lt. Col. Cockburn, R. A.—A piece of the linen covering of an Egyptian Mummy.

Mrs. Bouchette.—A large specimen of Coral.

W. Q. Skewes.—A piece of Red Egyptian Granite from the Pillar called "Pompey's" brought to this country by Captain Hopper of the ship Crown, broke off the pedestal by his carpenter.

Chief Justice Sewell.—A specimen of Iron Ore from St. Mary, Nouvelle Beauce. A specimen of Manganesian Garnet found at Charlesbourg. A Quebec Almanac, 1779. The original Diploma of Bachelor of Arts conferred upon an Indian, D. Ludovicus Vincent, by the College of Dartmouth, in 1781. The Manifesto published by General Wolfe on his arrival in the St. Lawrence, and his General Orders issued on board the Sutherland Ship of War off St. Nicholas the night before the battle of the 13th September, 1759, on the Plains of Abraham. The Manifesto published by Count D'Estaing on board the French Ship of War, the Languedoc, at Boston, Massachusetts, 28th October, 1778, addressed to all the ancient French in North America. Tables by J. Watt of the Temperature of the Atmosphere at Quebec, for the seven vegetating months of 1825. Specimen of Anthracite found between two rocks on Cape Diamond.

Mr. C. J. R. Ardouin.—A specimen of Intestinal Worm.

Dr. Lyons.—A specimen of Intestinal Worm. A specimen of Carbonate of Copper.

Lieut. Ingall, 15th Regt.—Five cases of Insects and 74 specimens of Minerals collected in exploring the country traversed by the St. Maurice expedition, in the summer of 1829.

F. X. Perrault, Esq.—A Model of a Wind Saw Mill made by a Canadian country carpenter.

His Excellency Sir James Kempt, G. C. B. & G. C. H.—An Achromatic Telescope by Dolland.

Mr. Robert Symes.—A specimen of Hyppocampus.

Mrs. Sheppard, Woodfield.—A Dipus Canadensis, "The Canadian Jerboa" caught at St. Foi.

Captain Bayfield, R. N.—53 specimens of Minerals from the Gulf of St. Lawrence. Specimen of Coraline from do. A specimen of Coral from Anticosti. A piece of oak being part of the plank of Ship Meteor, Captain Watson, remarkably perforated by Insects, while lying in a port six weeks.

Lieut. Baddely, R. E.—Specimens of Minerals from Kingston.

Revd. Dr. Harkness.—Five old Coins.

Rev. Joseph M. Bellenger.—An Indian Arrow Head found in a field at La Valtrie in 1829.

W. Henderson, Jr. Esq.—An Indian Arrow Head found at St. Joachim.

David Stuart, Esq.—An Indian Stone Hatchet.

Dr. X. Tessier, New York.—Begin's Therapeutics, 1 vol. translated into English by Dr. Tessier, with additional notes. The dedication Copy.

Francis Durette, Esq.—A Box Italian Marbles, containing 120 specimens or varieties.

Mrs. Augustin Germain.—A vol. Engravings, "Recueil de cent Estampes representant differentes Nations du Levant gravées sur les tableaux peints d'apres nature en 1707 et 1708, par les soins de M. Le Hay, à Paris, 1714."

Hon. Mr. Justice Taschereau.—A specimen of Maple Sugar 46 years old

Wm. Green, Esq.—An Indian Arrow Head, discovered by Mr. Murray, Farmer, in ploughing at Beauport. A piece of Turf or Peat from Ireland.

Joseph Lagueux, Esq.—A Fillet worn by the Jewish High Priests, containing the Decalogue written in Hebrew on a slip of parchment.

Mr. R. F. Maitland.—A Silver Coin, being a Queen Elizabeth Shilling.

Mr. Brent.—A piece of Continental money being a ten Shilling Note of the Virginia Convention, July 17, 1775.

Lyceum of Natural History of New York.—Two vols. 1st and 2d and two Nos. 1st and 2d of 3d vol. Annals of the Lyceum of Natural History of New York. Do. do. 2d and 4th Nos. of vol. 3.

Mr. Evans.—Specimens of Limestone and other Minerals from Shipton and Compton.

Sir Noel Hill.—A number of Cannister Shot of stone and iron, also a Musket Lock, found in 1818, on ploughing the Plains of Abraham

Mr. Buchanan, Consul, New York.—A Model of a Rail Road.

Dr. Wm. Fraser, Murray Bay.—A white Mouse.

Mr. Bowen, R. N.—A Snake from Hare Island.

Mr. Légaré.—A large Crystal of Carbonate of Lime from Cap Rouge.

Mr. David Anderson, Cornwall.—A portion of a cubical Crystal of Iron Pyrites, extracted entire from the centre of a rolled stone; it measured when whole two inches each side.

Mr. Wm. Hall.—A piece of Soapstone from the township of Brougham

Mr. W. S. Chapman.—A Galvanic Battery.

Dr. William Reece.—Munro's Anatomical Tables.

Albany Institute.—Nos. 1, 2, and 3 of their Transactions.

Dr. Tessier.—Dr. Beck's Address to New York State Medical Society.

G. M. Ross, Esq.—A list of the Recorders of London, from the year 1298 to 1789.

Revd. Mr. Bellanger.—A box of minerals, ochres, &c.

Revd. G. Bourne.—Combe's Elements of Phrenology. Ryan's thoughts on Education.

Dr. Jacob Porter.—His Pamplet on the use of the chlorides.

W. S. Sewell, Esq.—Head of an Indian Battle Axe, found at Beauport.

—— Hayden, Esq.—Specimens of Soapstone and other Minerals.

Hon. Mr. Justice Taschereau.—A Manuscript vol. containing an authentic statement of the officers, non-commissioned officers and privates of the Militia of Quebec, during the siege of that city in 1775–76, with a list of the volunteers engaged therein, and a statement of the number of deaths during the siege.

Justin Pierce, Esq.—His improved reference map of the valley of the Connecticut and Western section of New England.

W. Green, Esq.—Specimen of Anthracite. Specimen of a stone suitable to the purposes of Lithography, from the Island of Anticosti.

J. Bouchette, Esq.—Dr. Marshall's Treatise on the practical management of Vaccination.

R. D'Estimauville, Esq.—A number of Insects.

Historical Society of New York.—A complete series of their Transactions in five vols.

The Hon. Chief Justice Sewell.—Two 4to works, entitled, Memoires et Instructions pour servir les negociations

et affaires concernant les droits du Roi de France, 1675. Et Traites des droits du Roi très Chrestien sur plusieurs états et Seigneuries possedées par divers princes voisins, &c. 1680.

Sir W. Scott's History of Scotland.

Specimen of Freestone from Malbay.

Specimens, polished and unpolished of an excrescence said to be of the beech tree.

Revd. D. Wilkie.—A collection of Botanical Specimens made by the late Dr. Sparks, M. A.

Felix de Brunner, Ecr. Lt. Col.—Memoire sur l'emploi des vases clos portatifs pour la fabrication du charbon végétal, minéral et animal—*par Brevet d'Invention*, par Felix de Brunner, membre correspondant de la Société d'Encouragement pour l'Industrie Nationale de France.—Echantillons de toiles imperméables en fil, en coton, et fil et coton, par le moyen de la gomme élastique, par un procédé économique. A bottle containing a sample of Sirop de Patates.

Albany Institute.—Nos. 5 and 6 of 1st vol. of Transactions of the Albany Institute.

Town Major Frost.—A singular specimen of the potato.

James Ross, Esq.—The jaws of a Shark.

—— Jones, Esq.—A specimen of Portland stone, containing fossil shells.

W. Sax, Esq.—Two specimens of Serpentine, from the township of Leeds.

Charles Campbell, Esq.—Histoire politique de l'Allemagne, par le Vicomte de la Maillardiere.

Madame Gourgaud.—A singular specimen of the Star-fish.

E. C. Dupuis, Esq.—Two specimens of Otaheitean Cloth.

Dr. Lyons.—Twenty-five Engravings of newly discovered Plants.

John Adams, Esq.—A specimen of the Wax Plant, (myrica cerifera.)

Dr. Perrault.—Several articles of Chinese manufacture, viz.—a mantle, a silk apron, two specimens of paper made from the papyrus, a fan, and a pair of slippers.

Hon. John Hale.—A specimen of Virgin Copper, said to have been found in Upper Canada.

CATALOGUE OF LIBRARY.

Atlas, German—1784. 1 vol. folio.

American Journal of Science, Nos. 1 and 2.

Address to the Astronomical Society of London, 1 vol. 12mo.

American Mineralogical Journal, 1 vol. 8vo.

Annals of the Lyceum of New York, vols. 1 and 2, and four numbers of 3d. vol.

Almanac, Nautical—1830-31-32, 3 vols.

Tables for ditto, 1 vol.

Animaux sans Vertébres, (Lamarck's) 8 vols.

Barton's North American Flora, 1 vol. 4to.

Bonaparte's Ornithology, 1 vol. folio.

Bon Jardinier, 1825, 1 vol. 12mo.

Baskerville's Introduction to Mineralogy, 1 vol. 8vo.

Bourne's view of Quebec. 1 vol. 18mo.

Bouchette's Map of Canada.

Botany, Drummond's first step to, 1 vol.

Beck's Address to the New York State Medical Society.

Brand's Tables of definite proportionals.

Cleaveland's Mineralogy, 2 vols. 8vo.
Considérations sur les causes de la grandeur des Romans—Paris, 1769, 1 vol. 12mo.
Canadian Review and Magazine, Nos. 4 and 5.
Collections of the New York Historical Society.
Carlisle's Hunterian Oration, 1826, 1 vol. 4to.
Crawford's Bonapartiad, (poem).
Chlorides, Porter's translation of Labaraque, oñ the use of the
Chemical Manipulation, Faraday on.

Doctrine and Use of the Lord's Supper, Old English, 1550.
Daubeney on Volcanos, 1 vol. 8vo.
De la Beche's Tabular view of Rocks, 1 vol.
De Candolle's Vegetabilis, 2 parts.

Extraits, ou Précédents des Arrêts de Québec, 1824, 1 vol. 8vo.
Entomology, Kirby and Spence's Introduction to, 4 vols.
Education, Bryan's thoughts on (poem).
Encyclopedia Britannica, (new,) 1st vol.

Flora, English, (Smith), 4 vols.

Geology of England and Wales, (Conybeare), 1 vol. 12mo.
Galeries des Antiques, (Legrand), 1 vol. 8vo.
Greenough's Geology, 1 vol. 8vo.
Geological Memoir, from the Annales des Mines, by De la Beche, 1 vol. 8vo.
Greenough's Geological Map of England.
Griffith's Animal Kingdom, 24 parts.

Hearne's Journey, 1 vol. 4to.
Historia Canadensis, F. Cruxio, 1664, 1 vol.
Histoire Politique de l'Allemagne, 1 vol.

Jean de Lac, Histoire du Nouveau Monde, 1 vol.
Journal of the Academy of Natural Science.
Jamieson's Mineralogy, 1 vol. 8vo.
Jamieson's Manual of Mineralogy, 1 vol.
Journal of the House of Commons, 1643–44–45, 7 vols. folio.

Liber Veritatis, Prints of Lorraine's Sketches, 3 vols. folio.
Laws of the State of New York, 1 vol. 8vo.

Museum, 15 vol.
Michaux American Silva, 7 vol.
Munroe's Tables of the Nervous System, 1 vol. folio.
Mawe's Catalogue of Minerals, 1 vol. 12mo.
Manuscript Note Book, partly German, 1 vol.
Moh's Mineralogy, 3 vols.
Mineral and Mosaical Geology, 2 vols. 8vo.
Maculloch's Classification of Rocks, 1 vol. 8vo.
Mineralogy, Conversations on, 2 vol. 12mo.
Manuscript, containing list of officers, non-commissioned officers and privates of the Militia in Quebec during the seige by the Americans in 1776.
Map of the Valley of the Connecticut and Western Section of New England, by Justin Pierce, 1828.
Map of England and Wales, (Geological.)
Memoires et Instructions pour servir dans les négociations et affaires concernant les droits du Roi de France, 1675.

Nouvelles de la République des Lettres, 1685, 1 vol. 12mo.
Neturv Liceium, Indian Prayer Book, 1769, 1 vol.

Parkinson's Organic Remains, 3 vols. 4to.
Prayer Book in Mohawk Language, 1 vol. 12mo.
Phillip's Introduction to Mineralogy, 1 vol.
Phillip's Mineralogy and Geology, 1 vol. 8vo.

Pinkerton's Petralogy, 2 vols.
Pinkerton's Fossil Organic Remains, 1 vol. 12mo.
Prints of Eastern Costumes, 1 vol. folio.
Philosophical Magazine, Tillock's, 40 parts.
Pearson's Practical Astronomy, 2 vols.
Phreneology, Crombe's Elements of,

Quebec Gazette, 15 vols. folio.
Quebec Almanac for 1789.

Recorders of London, List of, from 1298 to 1789.
Reliquiæ Diluvianæ, Buckland's, 1 vol. 4to.

Scrope on Valcanoes, 1 vol. 8vo.
Specimens of Printing Types, 1 vol.
Schoolcraft's Lead Mines on the Missouri, 1 vol.
Science, Edinburgh Journal of, 4 Nos.
Scotland, Sir W. Scott's History of, 2 vols.

Transactions of the Geological Society, 7 vols. 4to.
Transactions of Society of Arts, Manufactures and Commerce, 43d vol.
Traités des droits du Roi très-Chrétien sur plusieurs états et seigneuries possedés par divers princes voisins, &c. 1680, 1 vol. 4to.
Transactions of the Albany Institute.

View of the Troubles in England, Charles 1st. time, 1681, 1 vol. folio.
Veta Functoreum Statu ex Hebrorum, 1 vol. 12mo.
Vaccination, Marshall on.

Wilson's Ornithology, 9 vols. folio.

York, (New) Transactions of the Hist. Soc. of, 5 vols. 8vo.

Zoology, Richardson's, 1 vol. 4to.

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Wollaston's Pocket Blow-pipe Apparatus.
Geometrical Solids.
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An Address by Joseph Skey, Esq. M.D.
And—at the end of the Volume, two Lithographic Maps and a Plan.

Quebec, August, 1830.

It is, no doubt, very generally known that one of the principal objects of inquiry contemplated by the founders of the Literary and Historical Society of Quebec, was the investigation of the Natural History of the Canadas. In furtherance of this important object, the Class of Natural History was formed, to which all communications relative to it are referred.

In my situation as Chairman of the Class, I have been requested to draw up an Address, to be circulated through the Province, inviting attention to the subject, and soliciting communications relative to it. I cannot but indulge a sanguine hope that the attention of the rising youth of the country in particular, will be directed to this interesting subject; it is so admirably calculated to occupy their leisure hours agreeably and usefully, to embellish and enlarge, as well as to invigorate their understanding: and above all to purify their taste, and to awaken in them a relish for some of the highest enjoyments of which we are susceptible.

The resources of this great country are so imperfectly known, and its population is so scattered over its vast surface, that it is by the co-operation only of many individuals that any approximation to the end in view can be obtained; that insulated and apparently unimportant facts become valuable when collected and grouped in a common centre, by which their relations to each other can be established and their anomalies explained.

The range of observation is a very wide one, including

as it does, all the objects of Natural History, animate and inanimate; the earth and its rocky basis—its surface, varying in its qualities and fitness for the endless variety of organized beings animal and vegetable, which depend upon it for subsistence; and capable, as it is, of an indefinite improvement in its productive powers under the hands of a well-conducted agriculture—the air we breathe teeming with life, and liable as it is to occurrences pregnant with good and with evil to us, guided in all its movements by laws, the mysteries of which we are yet so ignorant of: and that mainly from the deficiency of facts, on a comprehensive view of which, and of which alone, we can hope for an insight into the nature and causes of those wonderful phenomena which are so perpetually occurring, to the terror of the uninformed; but tending unequivocally to the well being of the whole.

This wide range of object, inviting to such an indefinite variety of pursuits, is most happily adapted to the different tastes of individuals, so that each may lay himself out for those inquiries, and furnish those contributions, to which his wish may incline, or his situation adapt him.

In a communication of this kind it is not possible to notice in detail the objects of peculiar interest; but it is obvious, with reference to inanimate objects, that we are all interested in obtaining information relative to the localities and modifications of the more useful rocks and minerals; of the applicability of the former to building, and to ornamental architecture; to the mason and the millwright.

Thus it appears that in the township of Broughton a bed of rock is found which will become of the most valuable application, since it combines durability with a softness

which renders it almost as workable as wood. It has become known to the community generally by means of the Society. Again, in another place, a rock well adapted for millstones has been found,—in a third locality it is said that a peculiar combination of iron stone with clay exists, which may hereafter render the country independant of a foreign supply of the principal ingredients in a cement, which will consolidate under water. It is known that iron ore abounds in the country, but it must be from inquiries made and specimens furnished, that those of the best quality and of the easiest reduction can be traced; and it may be that an enlightened curiosity may detect other mines of valuable metals: as of copper and of lead.

In a more advanced state of agriculture, the beds of lime and of gypsum, which no doubt exist, will become of the greatest use as manures, and for other purposes. The first step is to ascertain their presence and accessibility; their application will soon follow, so as to extend rapidly the productive powers of the country. In association with these last minerals it is more than probable that coal and rock-salt may be found, or at least springs of brine strong enough to be brought into use, whenever a judicious search is made for them.

In animal life, the country swarms with it in all the gradations, from the larger quadrupeds to the minute and yet unnamed insect. Any facts which develope their habits, the laws which regulate their increase and diminution, or their periodical migrations, will always be interesting to the Society; and not less so the contribution of specimens, particularly when new or rare.

Of vegetables, observations pointing out their localities, their use in the arts, or in domestic life as adding to our

choice of food, as applicable from the strength of their fibres to clothing or to cordage, or to our stock of useful medicines, will be received with satisfaction. It cannot be too well remembered that plants which in their natural state are most noxious, become harmless and even grateful under skilful culture: and that others require the aid of man only, to increase indefinitely the nutritive matter, which, in a wild state is scarcely traceable in them. Thus it is, that the most useful grains of wheat, rye, and barley have, from culture probably, (for their origin is lost in the depths of antiquity,) swollen into bulk, and have become the deposits of a greatly increased quantity of farinaceous matter; and the bitter and scanty root of the potato, as it is found in its natural state, is enlarged to its present dimensions, and has lost all its disagreeable qualities. Our finest fruits, in all their rich variety, have arisen from origins equally simple and unpromising; all the varieties of the grape have no doubt originated from a common stock, and that, austere and anything but grateful to the taste. It is probable that we are even yet but in the infancy of our knowledge of the extent and of the variety to which analogous products may hereafter arrive, so that, to select one among innumerable instances, it does not appear to be improbable that such a plant as the well known Indian rice (*Zizania aquatica*) even now the occasional resource of the aborigines, may hereafter become an abundant source of aliment: rivalling in these cold latitudes, its analogue of the tropics.

The remark applied to this one plant may be extended very widely, and to objects at present very little suspected to be capable of becoming useful;—the reference is made solely by way of illustration of a most important truth.

As a means of obtaining information so beneficial to humanity, so calculated to enrich the yet scanty agriculture of this country, and thus to increase her productiveness, the Society will at all times receive with thankfulness contributions bearing upon any of them; its obligations to individual contributors will be duly acknowledged and widely circulated. Specimens so furnished will be added to the cabinet with the names of the donors. The collection of the Society is already become a valuable one, and is rapidly improving.—Its utility is incalculably increased by the measures taken to classify and arrange the specimens, so that in time the rooms of the Society must become in many branches of Natural History, as it already is in Mineralogy, a valuable school of information. Its doors will be widely opened to all contributors, and these again will thus be rewarded for the aid they have afforded. There is no doubt also that the Society will be willing to enrol among its corresponding members, all who are residing at a distance, and who prove their wish to carry on its views by contributing their own observations; and especially those who furnish it with well authenticated facts, and also enrich its cabinet by their contributions.

In thus addressing the enlightened portion of the community, the Committee hope they do not call in vain upon it for all the aid which can be afforded towards the attainment of an object of such paramount importance, whether as regards the general prosperity of the country, the acquisition and dispersion of much useful information, and the awakening a relish for laudable pursuits generally.

JOS. SKEY, M. D.

Depy. Inspector of Hospitals.

Errata for LIEUT. BADDELEY'S *Communications.*

Page 82—2nd line, for *eastern* read *western*—5th line of same for *colorophane* read *chlorophane.*

Page 87—(Note,) for *analogies* read *analogues.*

Page 94—9th line, for *magnetic iron* read *magnetic iron ore.*

Pages 334, 340, 347 and 394—For *Houghborough* read *Loughborough.*

Pages 345, 350—For *sulphuret* of strontian read *sulphate* of strontian, and 6th line from bottom p. 345, for shaded read *shaped.*

Page 346—Last line, for *had* been read *have* been,

Page 361—(Note,) for *basalt* read *columnar basalt.*

Page 362—15th line, for *to have* read *to have had.*

Page 366—5th line from bottom, for *real* read *red,*

Page 376—13th line, for *octohedral crystals of iron and garnet* read *garnet and octohedral crystals of iron.*

Page 379—8th line from the bottom, for *probable* read *improbable.*

Page 384—12th line, for *various* read *variable.*

Page 389—5th line, for *impossible* read *infusible.*

Page 390—3rd line, for *heuzenite* read *lenzenite.*

Page 410—5th line, for *which* read *what.*

Page 412—11th line, for *limestone* read *sandstone,* 17th line of same page, for *argillate* read *argillite.*

Page 413—21st line, for *leave* read *have.*

NOTE.—The graphite mentioned at page 368 appears, upon further examination, to be an earthy chlorite intermixed with some black powdery substance; when *dry* its powder and streak are greenish.

Errata in the Topographical Notices, by ALEXANDER SHIRREFF, Esquire.

Page 254—5th line from bottom, for "least" *read* last.

Page 260—5th line from top, for "stream amidst" *read* stream producing amidst.

Page 262—5th line from top, for "moss" *read* mass.

Page 262—8th line from bottom, for "most fertile" *read* least fertile.

Page 264—13th line from bottom, for "equal depth" *read* great depth.

Page 264—2nd line from bottom, for "great tracts" *read* good tracts.

Page 265—10th line from bottom, for "la Bosse" *read* La Posse.

Page 265—9th line from bottom, for "entrance" *read* clearance.

Page 269—12th line from top, for "paddles" *read* paddlers.

Page 275—13th line from top, for "difficulties" *read* difficulty.

Page 276—8th line from top, for "Hurons" *read* Huron.

Page 278—10th line from top, for "stream" *read* run.

Page 279—5th line from top, for "heavy" *read* heaving.

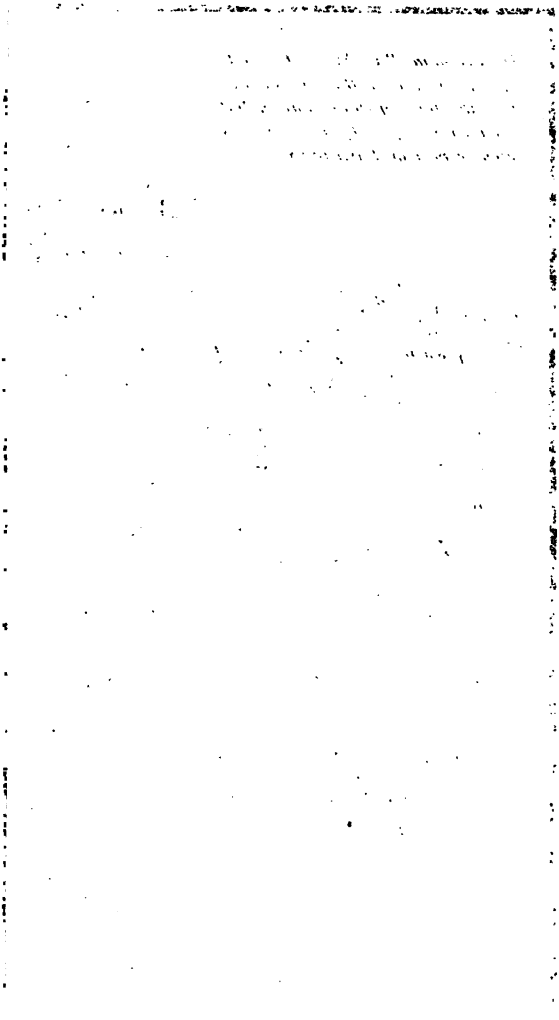
Page 281—17th line from top, for "for the stream" *read* The stream.

Page 283—4th line from top, for "have not yet" *read* read have yet.

Page 300—7th line from bottom, for "and" *read* ends.

Page 304—15th line from top, for "strong" *read* stony.

Page 307—3rd line from top, for "the immense" *read* this immense.



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